Colibri, open source software for rapid laser scanning microscopy

Christian Seebacher, Schomiron Neogy, Joachim Walter, Rainer Uhl
BioImaging Zentrum der LMU München, Grosshadernerstr. 2, D-82152 Martinsried, Germany
E-mail: seebacher@biz.uni-muenchen.de

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We have developed a LabView-based software for image acquisition by means of digitally controlled rapid laser scanning microscopy. To emphasise the speed and versatility of the system it drives we have named it Colibri*.

The development of Colibri is currently supported by cooperating laboratories. By presenting the software at the FOM, we hope to broaden its user base and recruit additional collaborators.

Colibri uses a vector based description scheme for the movement of the laser focus, allowing arbitrary scan paths. Noise associated with analogue signal conversion and transmission to the galvo boards is eliminated by a digital interface. We achieve more than 1,000 lines per second at maximal excursion, and the speed is only limited by the heat dissipation of the galvanometers.

The signal of the photodetectors is oversampled at 4MHz and binned to pixel dwell times ranging from 500ns to more than 15ms.

Colibri includes a scripting feature to control the acquisition of stacks and time series. The internal driver structure allows an easy implementation of new hardware.

We use Colibri for our iMIC-based dual emission multi photon microscope work station.

* Colibris or hummingbirds are aeronautical artists. Their full control of the direction of thrust allows motion in any direction: up, down, forwards, to either side, and backwards. They can even do backward somersaults.