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A Blender addon for the 3-d digitizer FASTRAK for plant structure acquisition

Katarzyna Wasilczuk,[1] **Michael Henke,**[1] **Katarína Smoleňová,**[1] **Yongzhi Ong**[1] and **Winfried Kurth**[1]*
[1]*Department Ecoinformatics, Biometrics and Forest Growth, Georg-August University of Göttingen, Büsgenweg 4, 37077 Göttingen, Germany*
**correspondence:* wk@informatik.uni-goettingen.de

Highlights: An addon for the open-source 3-d graphical modelling software Blender was implemented. It enables communication with the electromagnetic 3-d digitizer FASTRAK via a serial interface. Discrete and continuous point acquisition mode, immediate visualization in Blender's 3-d view, acoustic feedback, creation of standard geometry (e.g., cylindrical internodes) and of free-form volumetric shapes (for fruits, tree trunks etc.), calibration and rectification in case of field disturbances, and MTG export are supported. Tests confirmed that the addon has some advantages against previous software for the FASTRAK digitizer.

Keywords: electromagnetic digitizer, 3-d data, position tracking, Blender, FASTRAK, Polhemus

Blender (Blender Foundation 2012) is a multi-purpose, open-source 3-d modelling tool providing various interactive navigation, editing and animation functions. We implemented an addon which can be activated within the GUI of Blender and which communicates with the Polhemus FASTRAK digitizer. Our addon provides some extensions compared to existing software (e.g., Donès et al. 2006), namely, the option to switch between discrete and continuous position acquisition mode, improved calibration and rectification facilities (using linear transformations) and sound feedback during the tracking process. Export of the resulting 3-d virtual plants in simple tables and in a subset of the MTG data format (Cokelaer & Pradal 2009), which can be processed by GroIMP (Kniemeyer & Kurth 2008) and by OpenAlea (Pradal et al. 2008), are supported. Future improvements will include extensions to the MTG export and enhancement of the triangulation method which we currently use for free-form shapes (leaves, fruits, flowers). – This research was partially funded by DFG under project identifier Ku 847/8-1. All support is gratefully acknowledged.

Fig. 1 (from left to right): Screenshot of Blender, photograph of a strawberry plant and virtual reconstruction as result of using the FASTRAK 3-d digitizer with the new Blender addon (from Wasilczuk 2012).

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