PlatformCommander

An open source software for an easy integration of motion platforms in research laboratories

Matthias Ertl[1], Carlo Prelz[2], Daniel C. Fitze[1], Gerda Wyssen[1], Fred W. Mast[1]

[1]Department of Psychology, University of Bern, Bern

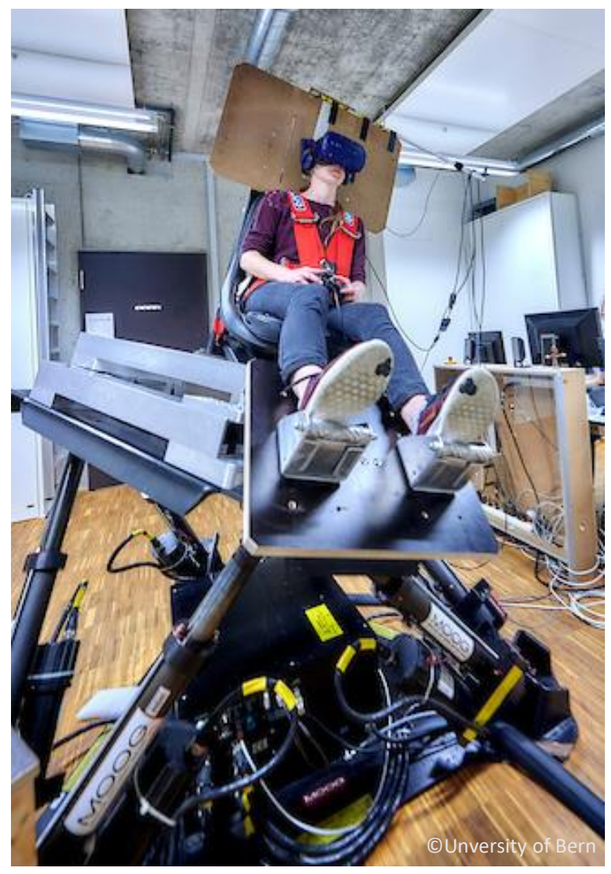
[2]Technologieplattform Forschung, Faculty of Human Sciences, University of Bern, Bern

Background

Motion platforms are devices that allow for a selective stimulation of all five sub-components of the peripheral vestibular organ with high temporal and spatial precision. This makes motion platforms a valuable tool in clinical and basic [1] vestibular and motion research.

Despite the wide range of application in human [2,3] and primate [4] research, No standard regarding a software package for interfacing the platform and controlling its motions has emerged and most labs have developed their own code for interfacing their hexapod. These customized, closed-source solutions are in contrast to the current open-science research practice as they hinder inter-lab collaborations, comparisons, replications, or shared efforts for implementing new features.

PlatformCommander is an open-source software package for interfacing motion platforms which allows for rigorous and flexible experiment control. It is ideal for the synchronization of data from different sources with high temporal precision.

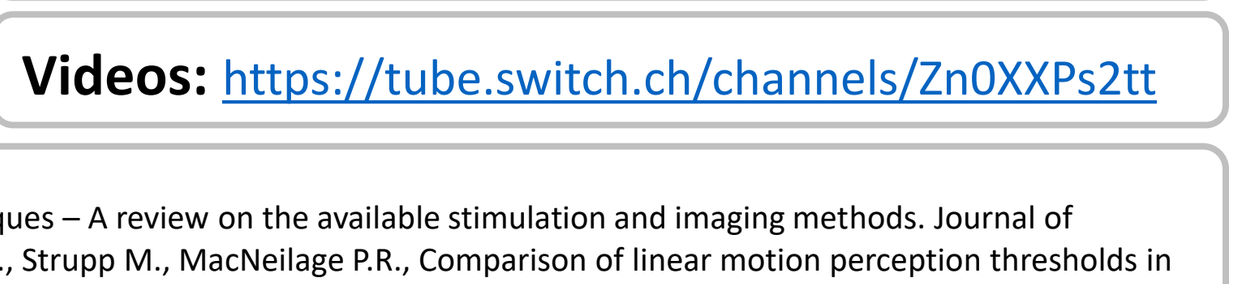


Key-Features

- Supported models: MOOG 6 DOF 2000E & MB-E-6DOF/12/1800KG
- Visual output to standard screens or VR-headsets (VIVE, VIVE PRO, VIVE PRO2, PIMAX 8KX)
- Complex visual sceneries through rendering of 2D, 3D objects or playback 360° videos via an Open GL engine
- Audio output via soundcard
- Control external GVS-devices (NeuroConn DC-Stimulator) via i/o-card
- Registration of buttons, mouses, joysticks, game-controllers (USB or i/o-card) input
- Data-input from accelerometers, gyroscopes (USB or i/o-card)
- Consistent & synchronized data/event logging

Set-Up

The client–server architecture encapsulates the time critical communication with the hexapod. The server performs simulations (safety checks) of all motions before they are executed and offers a simple interface for clients. Client application can be written in any programming language. A sample client written in Julia is available online.



Getting started

- Install the emulator on a RaspberryPi or Linux (no motion platform needed!): https://gitlab.com/KWM-PSY/emulator
- Look into the Manual: https://zenodo.org/record/5743201
- Play with our client application: https://gitlab.com/KWM-PSY/julia_config

Coming Soon

- Integration of *.glTF format (in progress)
- Synchronization with EEG
- Eye-tracking (Droolon Pi1)

Contact: matthias.ertl@unibe.ch

Videos: https://tube.switch.ch/channels/Zn0XXPs2tt

References

[1] Ertl M., Boegle R., Investigating the vestibular system using modern imaging techniques – A review on the available stimulation and imaging methods. Journal of Neuroscience Methods (2019) **[2]** Bremova T., Caushaj A., Ertl M., Strobl R., Böttcher N., Strupp M., MacNeilage P.R., Comparison of linear motion perception thresholds in vestibular migraine and Menieres disease. European Archives of Oto-Rhino-Laryngology (2016) **[3]** Ertl M., Klaus M.P., Mast F.W., Brandt T., Dieterich M., Spectral fingerprints of correct vestibular discrimination of the intensity of body accelerations. NeuroImage (2020) **[4]** Gu Y., Vestibular signals in primate cortex for self-motion perception. Current Opinion in Neurobiology (2018)