Brno University of Technology
Faculty of Information Technology

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Report type: **Final research report for project**

User Interface for Robotic Platform

User interface for robotic platform control in human–machine interaction

Annotation:

The summary report introduces the research on the user interface for a robotic platform control in human–machine interaction. The researched functions are controlled through a touch enabled user interface, with an emergency stop capable of halting the platform's motion and control system. The designed user interface contains bilingual localizations in English and Romanian languages.

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The control of the robotic platform itself is based on an inverse kinematic approach which links calculated actuator extension to the upper effector's rotations. An important control design element is the definition of the workspace range, i.e. the platform's motion envelope. The envelope is defined as a space where the end effector (the upper platform) can execute its collision free motion. The motion platform's size, operational range of the actuators and the angular range of its joints are necessary to be considered during the design stage.

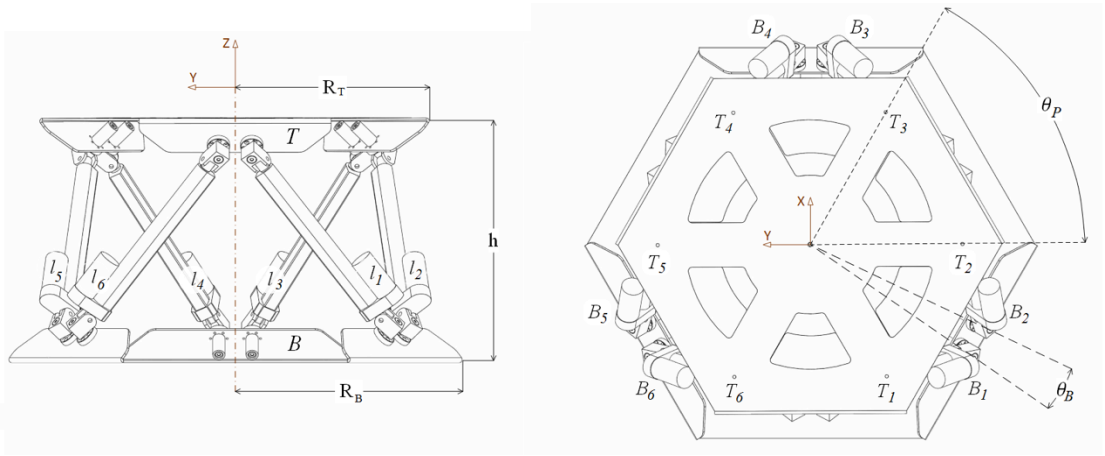

Fig. 1: Robotic platform's geometry

The researched and subsequently implemented functions for robotic platform control are listed below:

- Direct position control to allow 6 Degrees-of-Freedom (6DoF) robotic platform positioning along (translations) and around (rotations) the platform's principal x, y and z-axis. An important aspect of the position control approach is the option to intuitively return to the original position state.
- Position control replay from recorded data allows the use of predefined motion cases (trajectories). While in the replay mode, the robotic platform's attitude reflects the system's state defined by its exact position in the recording. Replaying the recorded cases can be halted, paused and run again. Individual records are stored as external files, list of which is refreshed at the system start. This allows the records to be added, erased, edited while the system keeps track of the changes.
- Motion frequency and amplitude setting along vertical axis defined by function *sinus*, for a frequency range 0.1 to 5.0 Hz.

All researched control functions are controlled through touch enabled user interface, with an emergency stop option capable of halting the platform's motion and control system. The designed user interface contains bilingual localizations in English and Romanian languages.

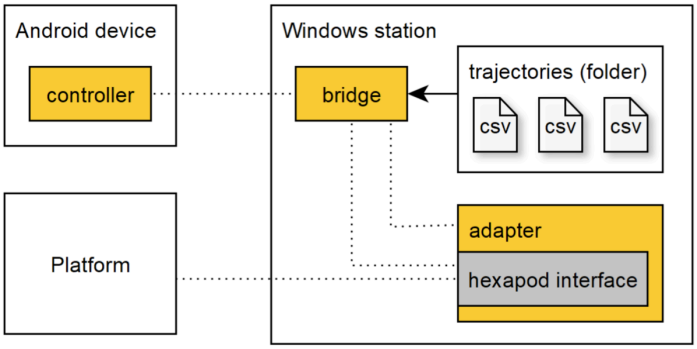

Fig. 2: System level description

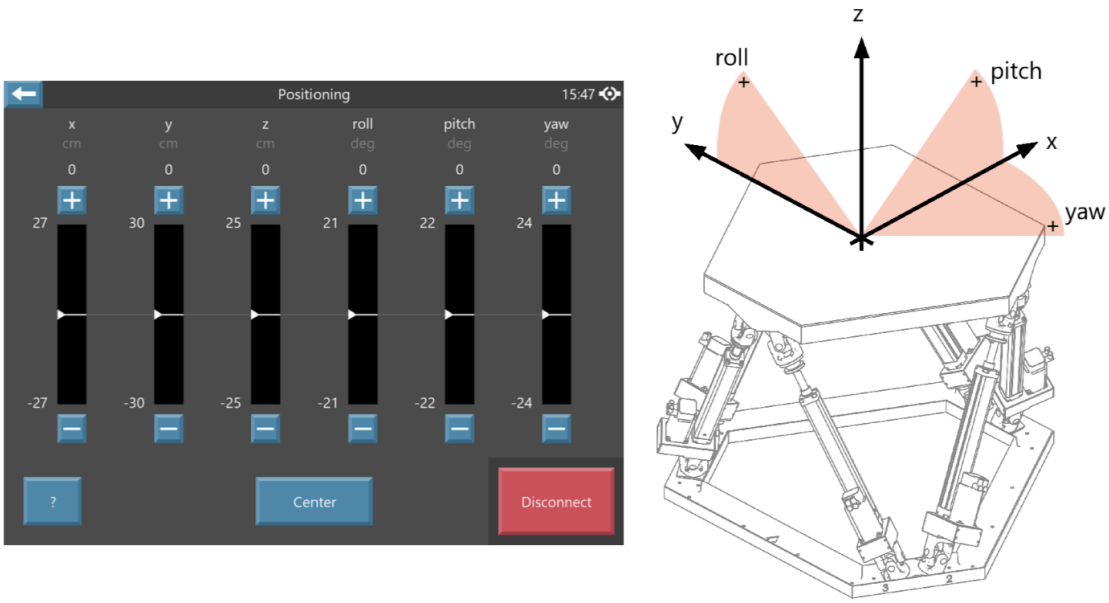

Fig. 3: Robotic platform's positioning interface and attitude definition

Objednatel	**VR Group, a.s.**
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Číslo smlouvy objednatele 18/09/11/GŘ

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Tímto se potvrzuje, že 26. června 2018 Zhotovitel předal dílo Objednateli a Objednatel převzal dílo dle smlouvy objednatele č. 18/09/11/GŘ bez závad.

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Za zhotovitele:

Za objednatele: