

# Projet : *IPASTRAS*

## The Perception-Action Space in Image Guided Surgery

Coordinateur du projet : DRESP-LANGLEY Birgitta

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## Résumé du projet

- **Résumé :**

The speed and the precision (*speed-accuracy trade-off function*) of specific surgical gestures will be measured in a learning experiment under two experimental conditions: 1) viewing through an immersive, head-mounted Virtual Reality system tethered to a laptop and 2) natural free viewing of the visual input displayed on the 2D screen. The results of this pilot study will lead to a better understanding of sensorial and motor learning in image guided surgery and create a basis for further experiments under conditions of extremely constrained eye-hand coordination in the execution of surgical gestures, as in robot-assisted procedures.

- **Mots clés:** *sensori-motor learning; eye-hand coordination; surgical gestures; 2D image viewing; head-mounted immersive VR; speed-accuracy trade-off*



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## Problématiques scientifiques

- **Objectifs scientifiques** : Identify critical parameters of the perception-action space determining the reliability of specific surgical gestures guided by 2D image viewing. We use a surgical simulation environment where the user processes visual information about target areas under varying conditions. The speed and the precision (*speed-accuracy functions*) of specific surgical gestures will be measured for one-handed and two-handed manipulation of surgical tools.
- **Approche envisagée** : Sessions of several hundred trials per block simulating specific surgical target gestures. The tool movements will be monitored from different angles by four cameras. Measures will be taken under two conditions of image viewing: **1)** viewing through an immersive, head-mounted Virtual Reality device (Oculus Development Kit 2<sup>nd</sup> generation) tethered to the simulator system and driven by software specifically designed for the experiments **2)** natural free screen viewing of the 2D image display.
- **Originalité** : The project is focused on *cognitive functional characteristics* driving the *perception and action of the human operator* (surgeon) in image guided surgical processes.



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## Participants

- Nom(s) du ou des coordinateurs : DRESP-LANGLEY Birgitta, CR1 HDR
- Noms des participants : VON CASTELL Christoph, Postdoc (DAAD), HECHT Heiko, PU (U Mainz)
- Équipes impliquées : MMB
- Axes transverses concernés : IRMC



Now, where am I supposed to cut ???



## Complémentarité des participants :

Birgitta **Dresp-Langley**: *cognitive function, perception, behavior analysis, psychophysics*

Christoph **von Castell**: *image processing, visual interfaces, user ergonomics*

Heiko **Hecht**: *man-machine interaction, simulator environments*