

Robotic Camera Guidance for Minimally Invasive Surgery

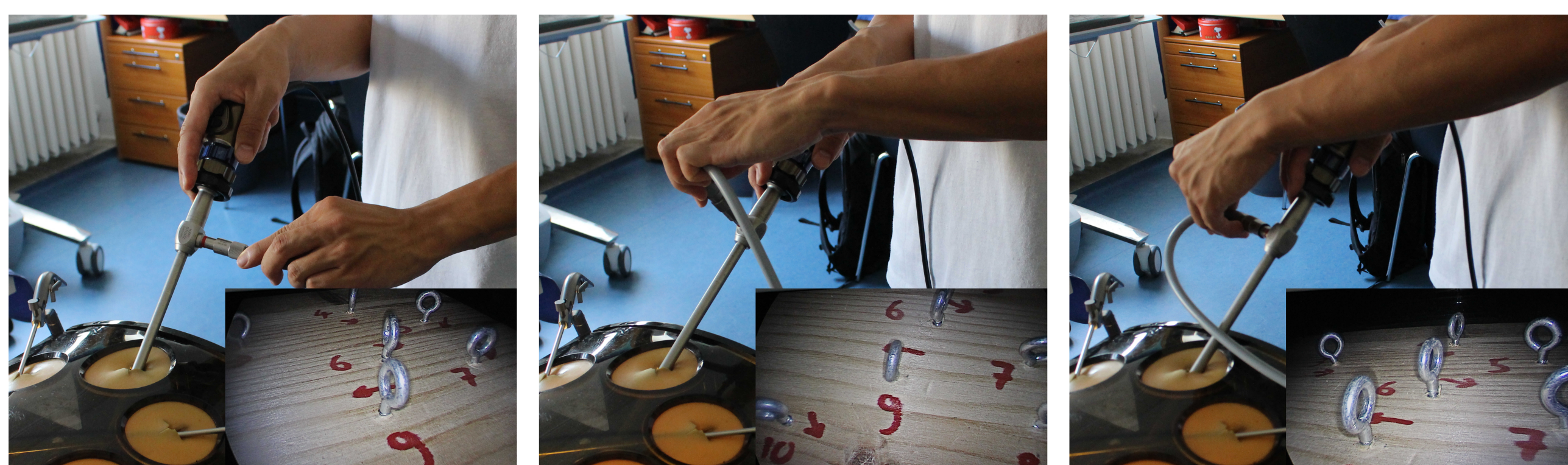
Mechatrical Interface for Endoscopes

Bachelor's or
Master's Thesis

Context

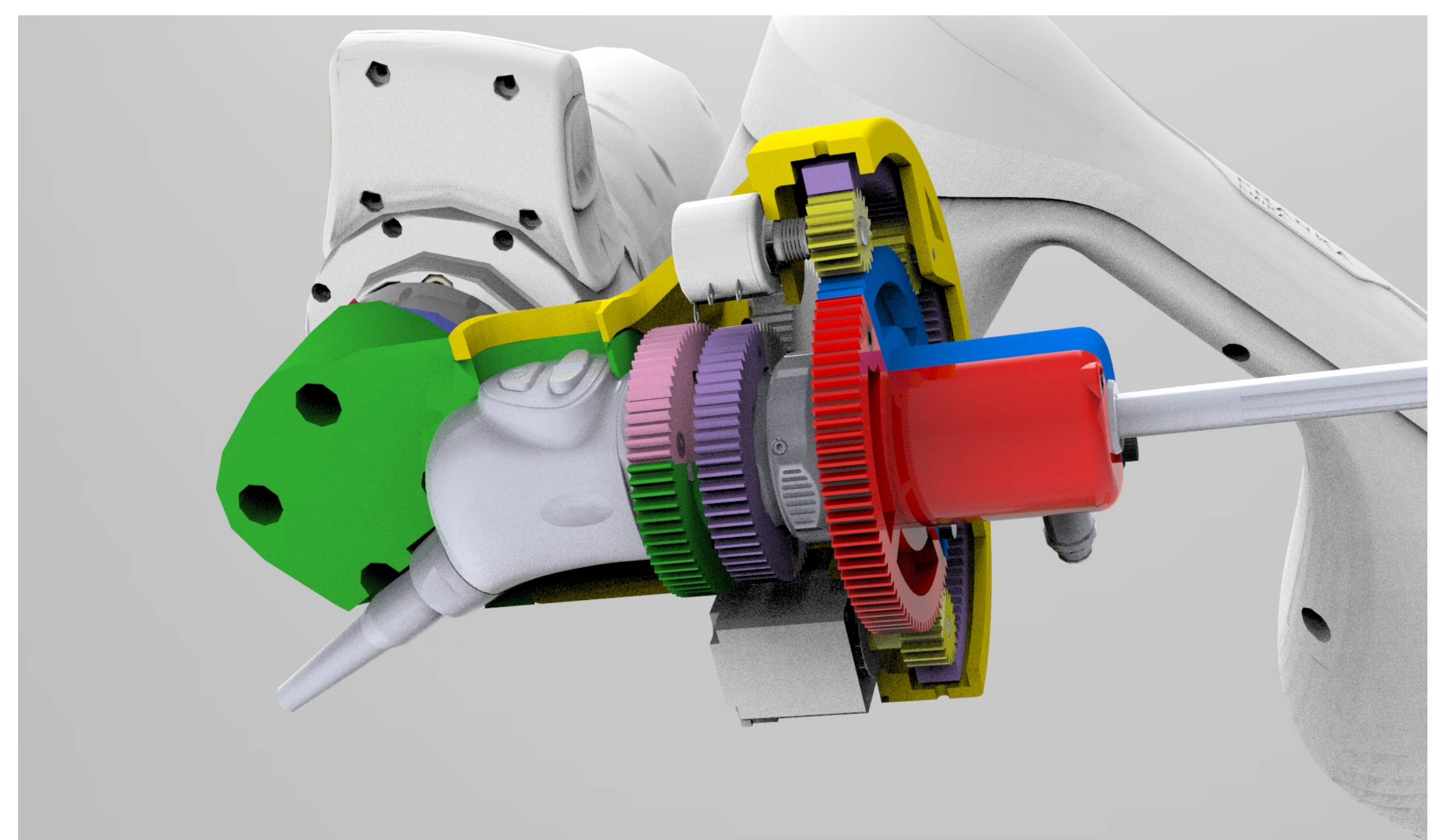
Endoscopic cameras are the surgeon's only source of visual information during minimally invasive surgery of the abdomen (laparoscopy). Surgical tools and endoscope are inserted through small incisions in the abdominal wall, in contrast to open surgery where large incisions are made. The physical constraints of laparoscopy, however, necessitates the use of **specialised endoscope optics** (oblique-viewing scopes) that collect light from an angle of e.g. 30 degrees, to properly visualize undercuts, the abdominal wall, and many more views that are not obtainable with standard forward viewing optics.

Specialized mechatrical interfaces are designed to facilitate the use of such endoscopes in **robotic surgery**. Actuation and sensing is required to control the additional degree of freedom, introduced by the oblique-viewing scope.



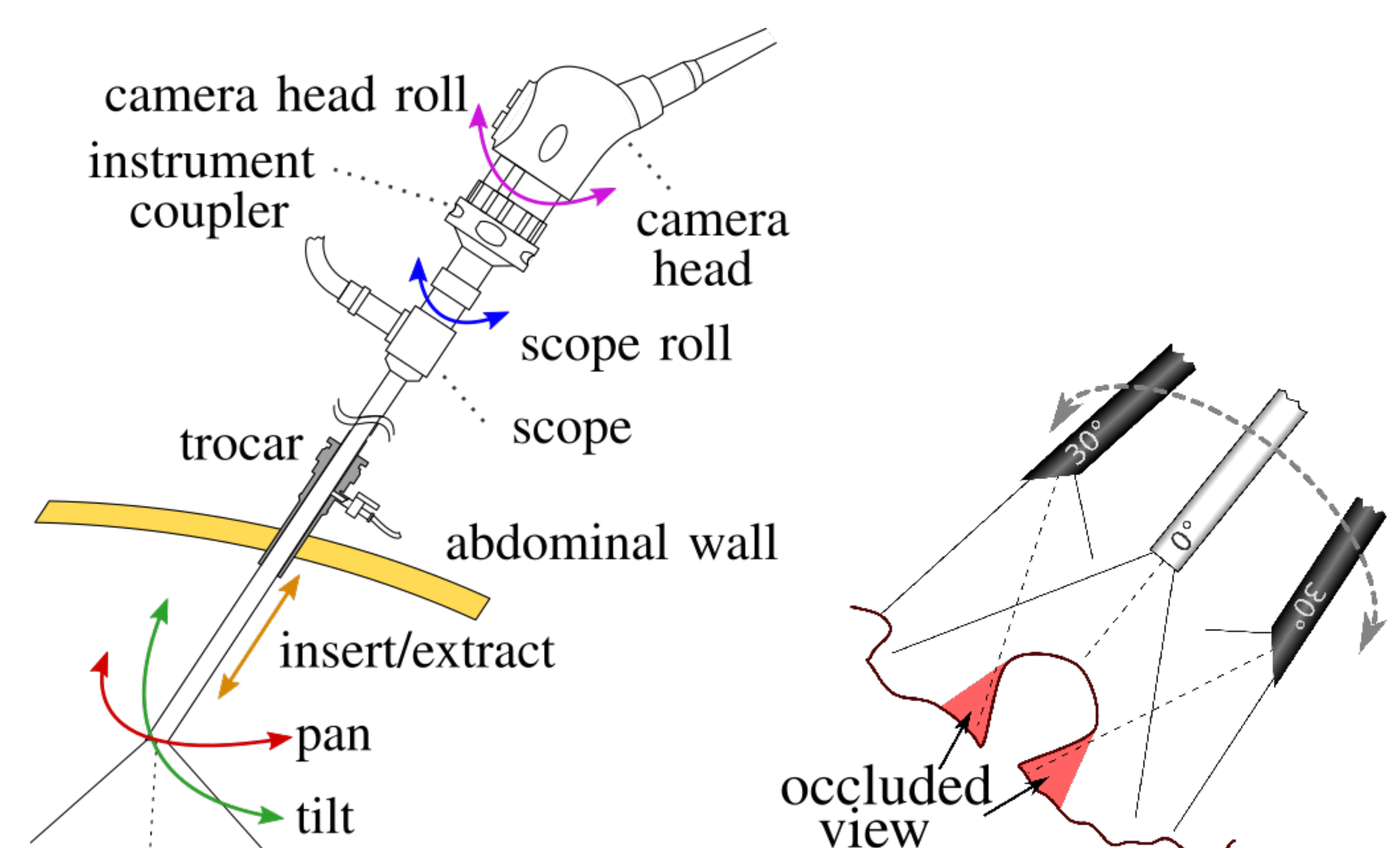
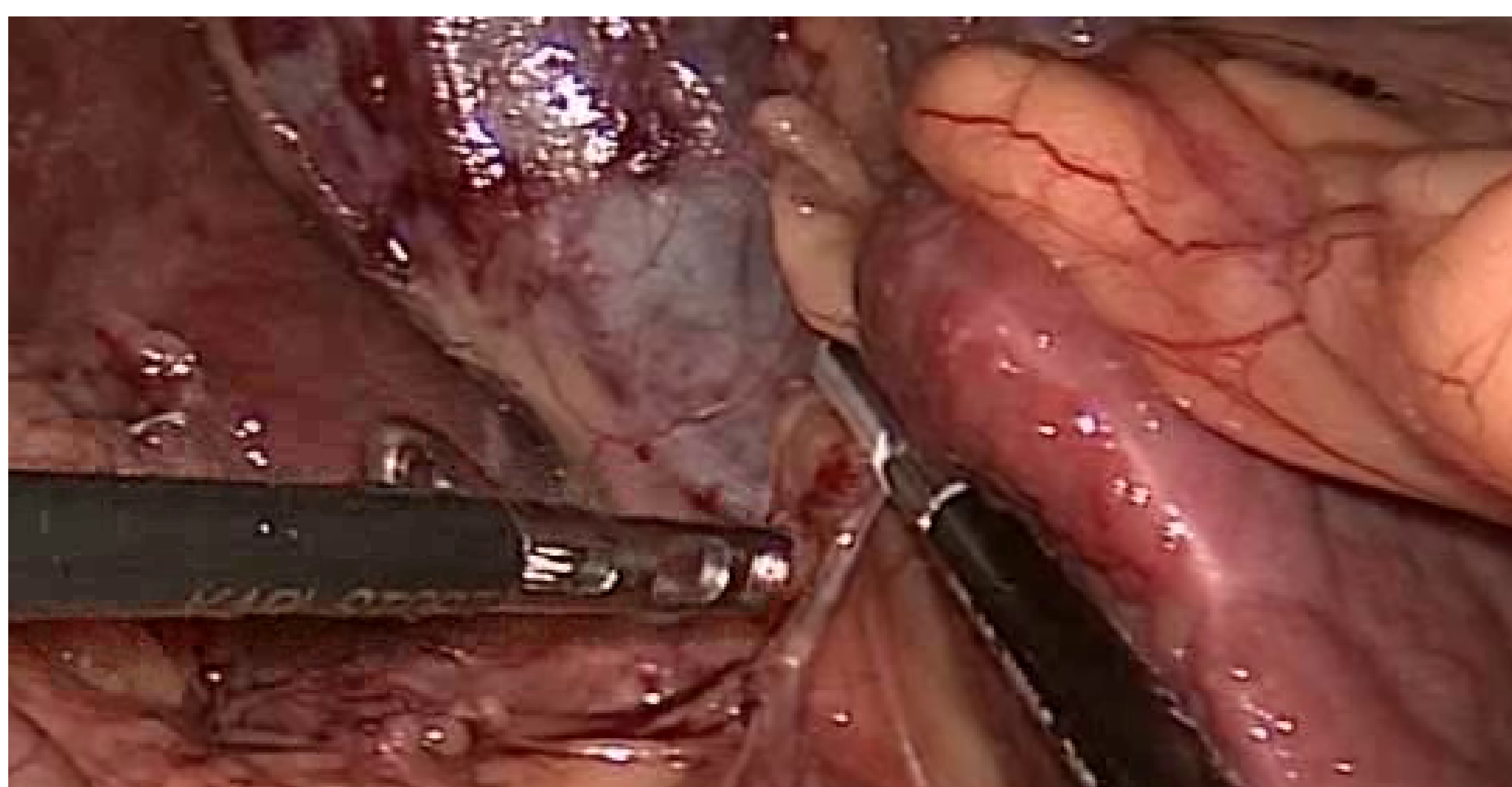
Task Summary

- Further development of our mechatrical interface between a 30° oblique-viewing endoscope (by Karl Storz) and the Franka Emika Panda robot (mechanical design, sensors, actuation, and software).
- Control of the mechatronic system with ROS (Robot Operating System).
- Building an evaluation setup for the mechatronic system.
- Evaluating the system in regard to precision and usability.



Goal

This work focuses on **further development** of the current version of our mechatrical interface and **publishing the results at an international conference**. In order to publish results on the improved version, this work also includes designing and implementing a test setup to evaluate the system together with our **surgical partners from Heidelberg University Hospital**.



Contact

Paul Maria Scheikl, M.Sc.
Building 40.28
Room 002.2
paul.scheikl@kit.edu