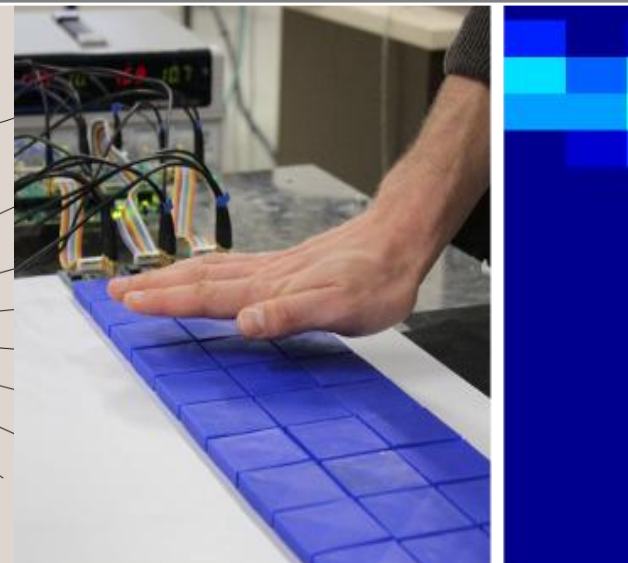
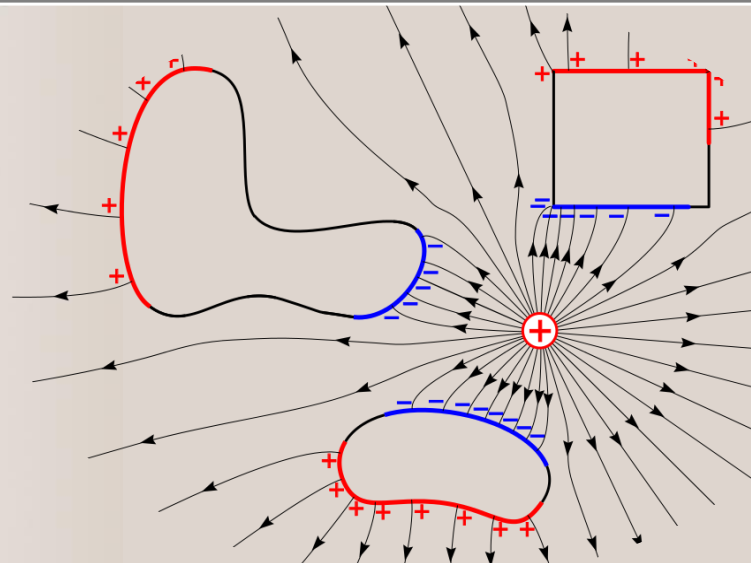
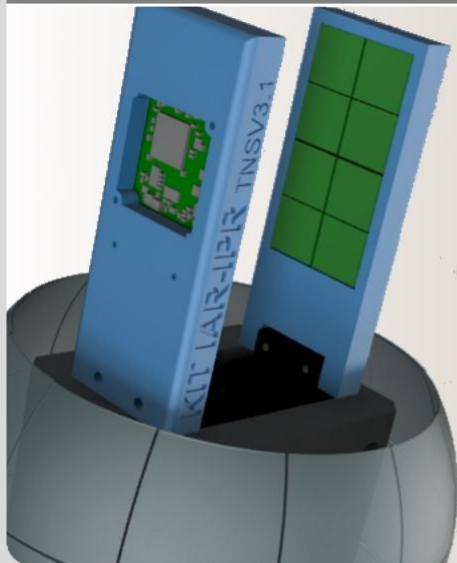


Teaser: Proximity Sensing - Closing the perception gap

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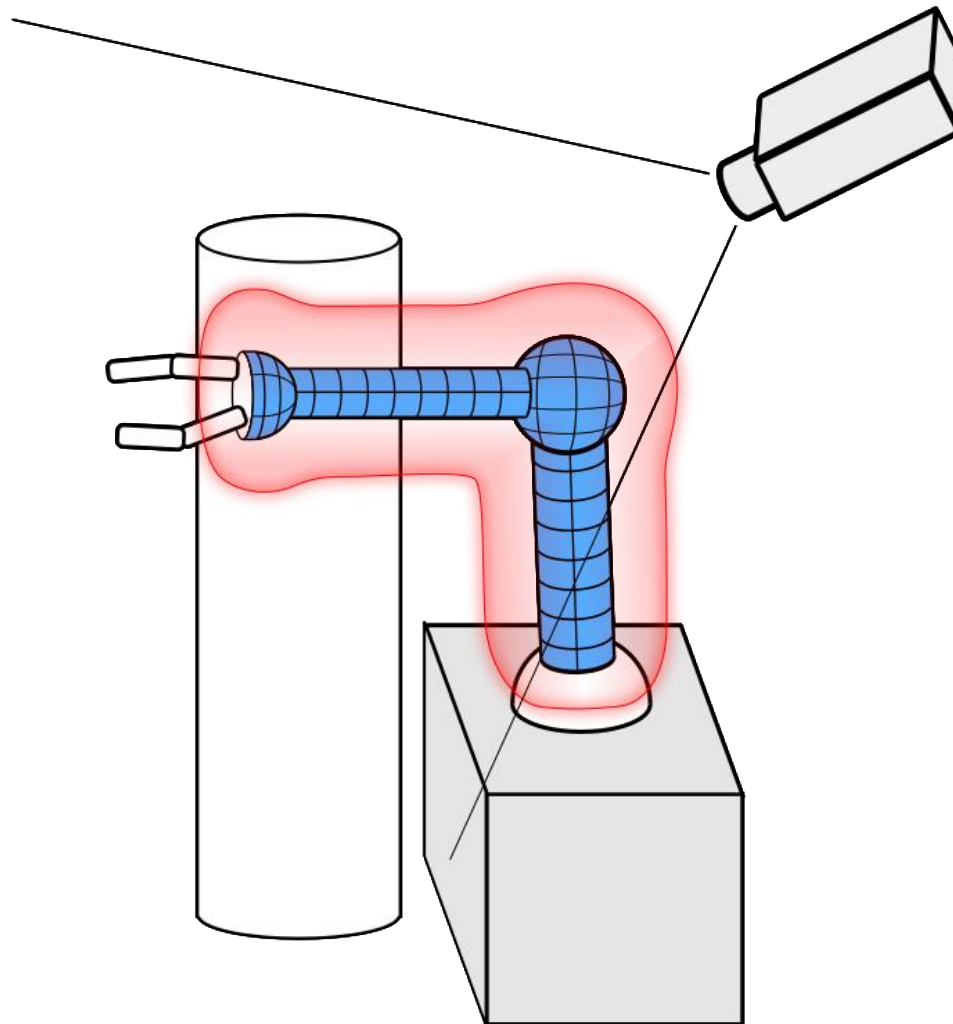


6th sense

Proximity sensing



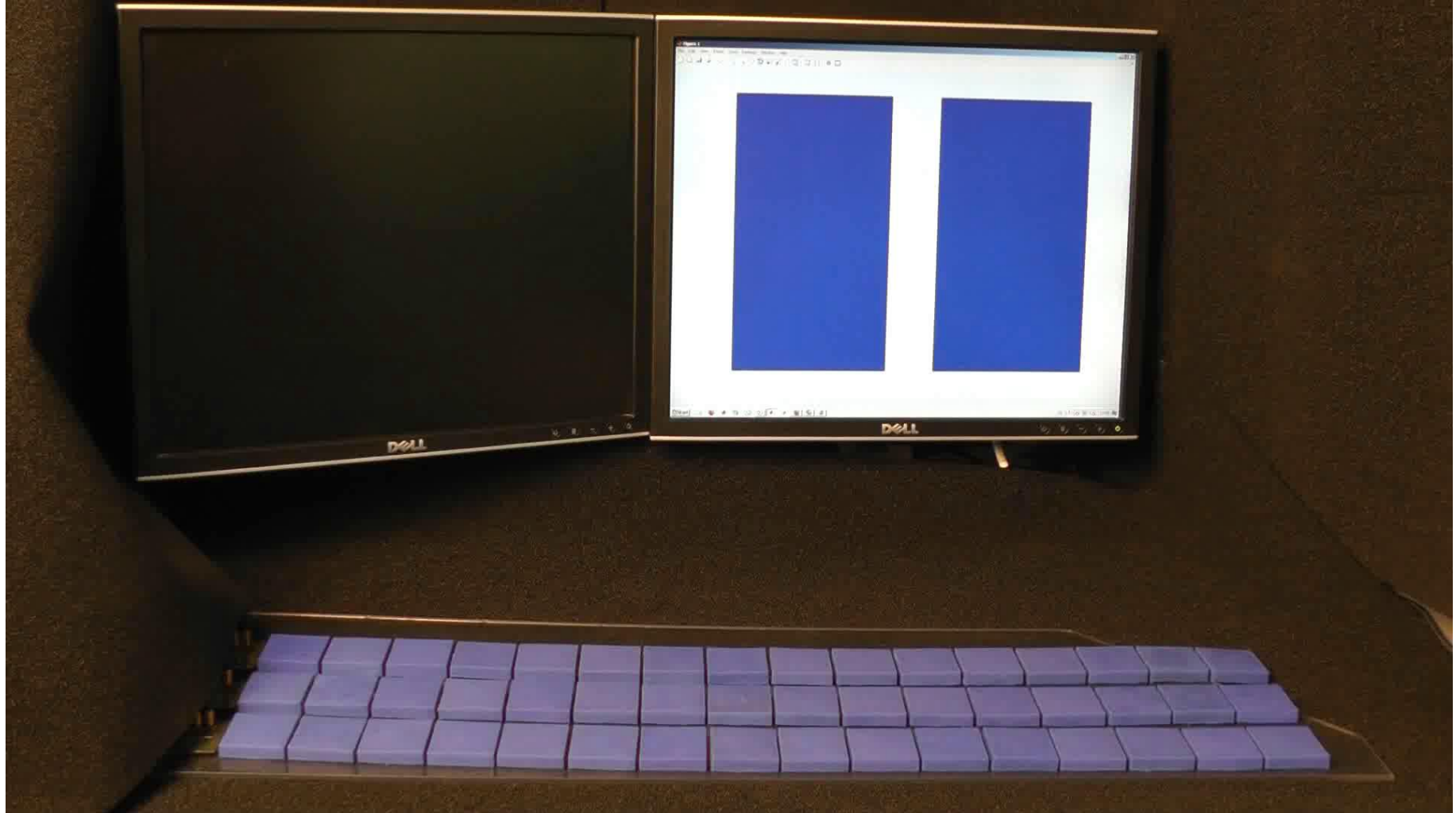
Question: Detection and avoidance of obstacles



CONCEPT & TECHNOLOGY

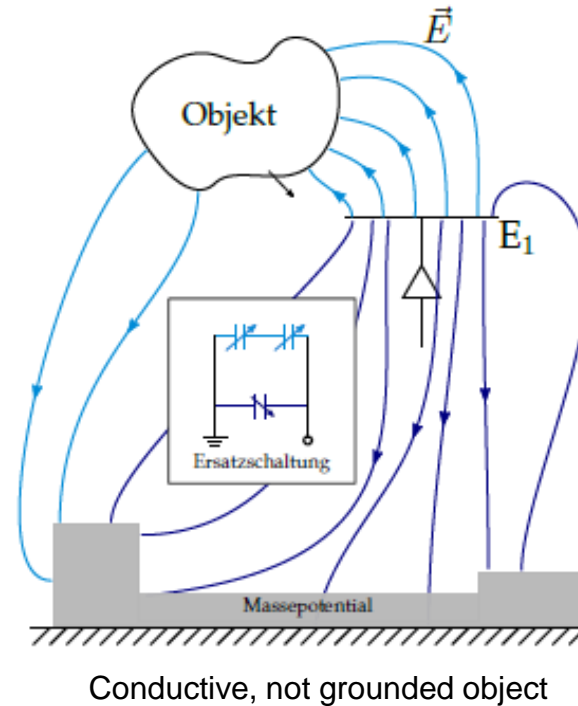
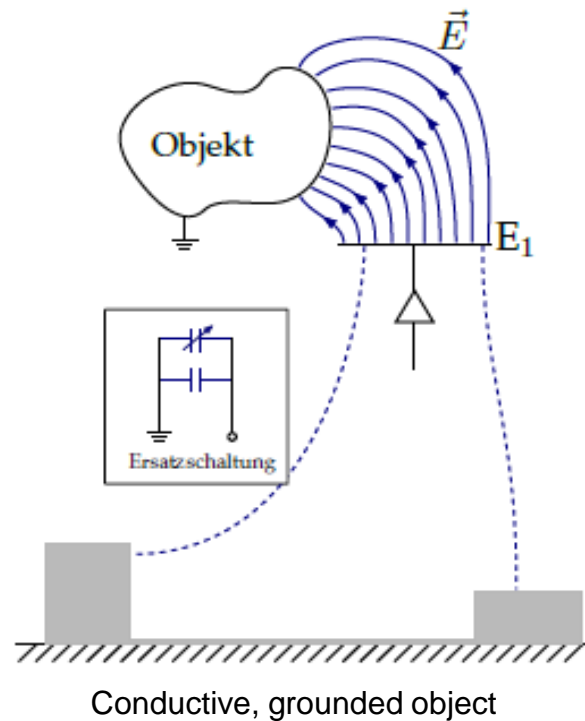
Large area sensor for robot skin applications

Sensor realisation

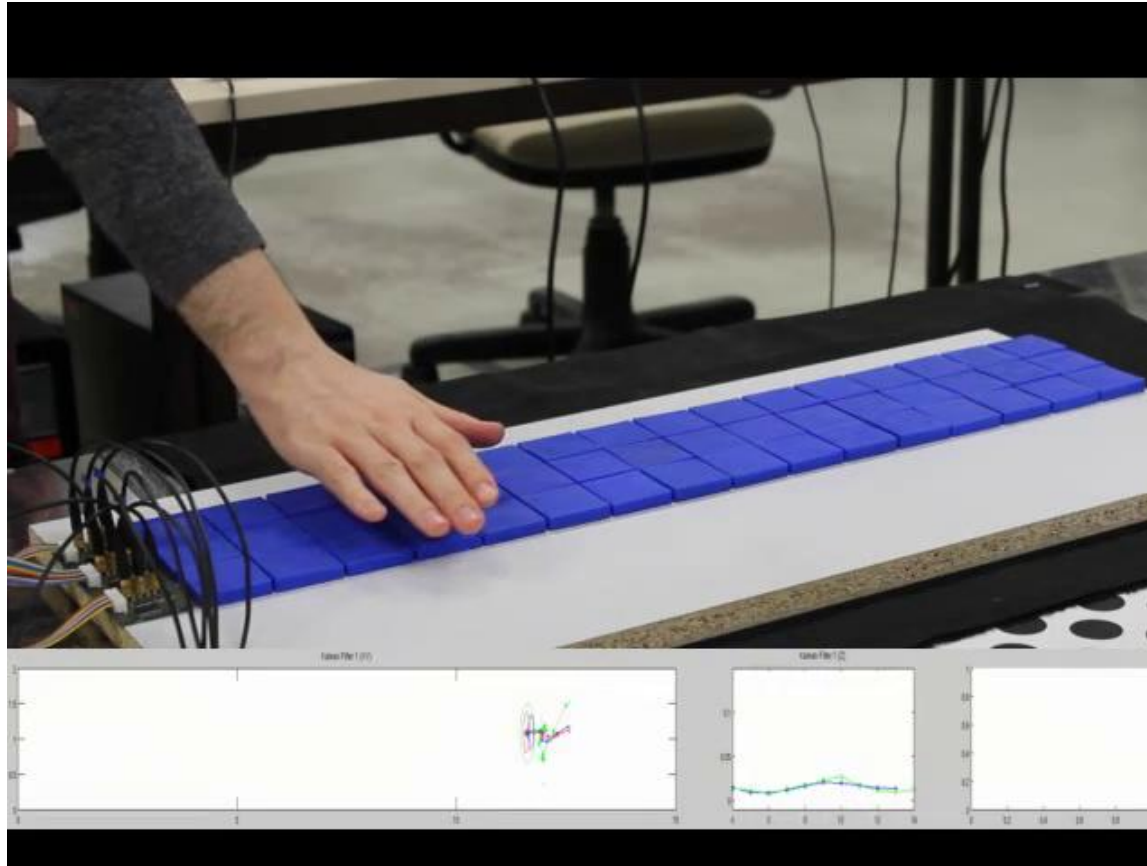


■ Visualisation: left tactile, right proximity

Physical Fundamentals – measurements modes – self capacitance



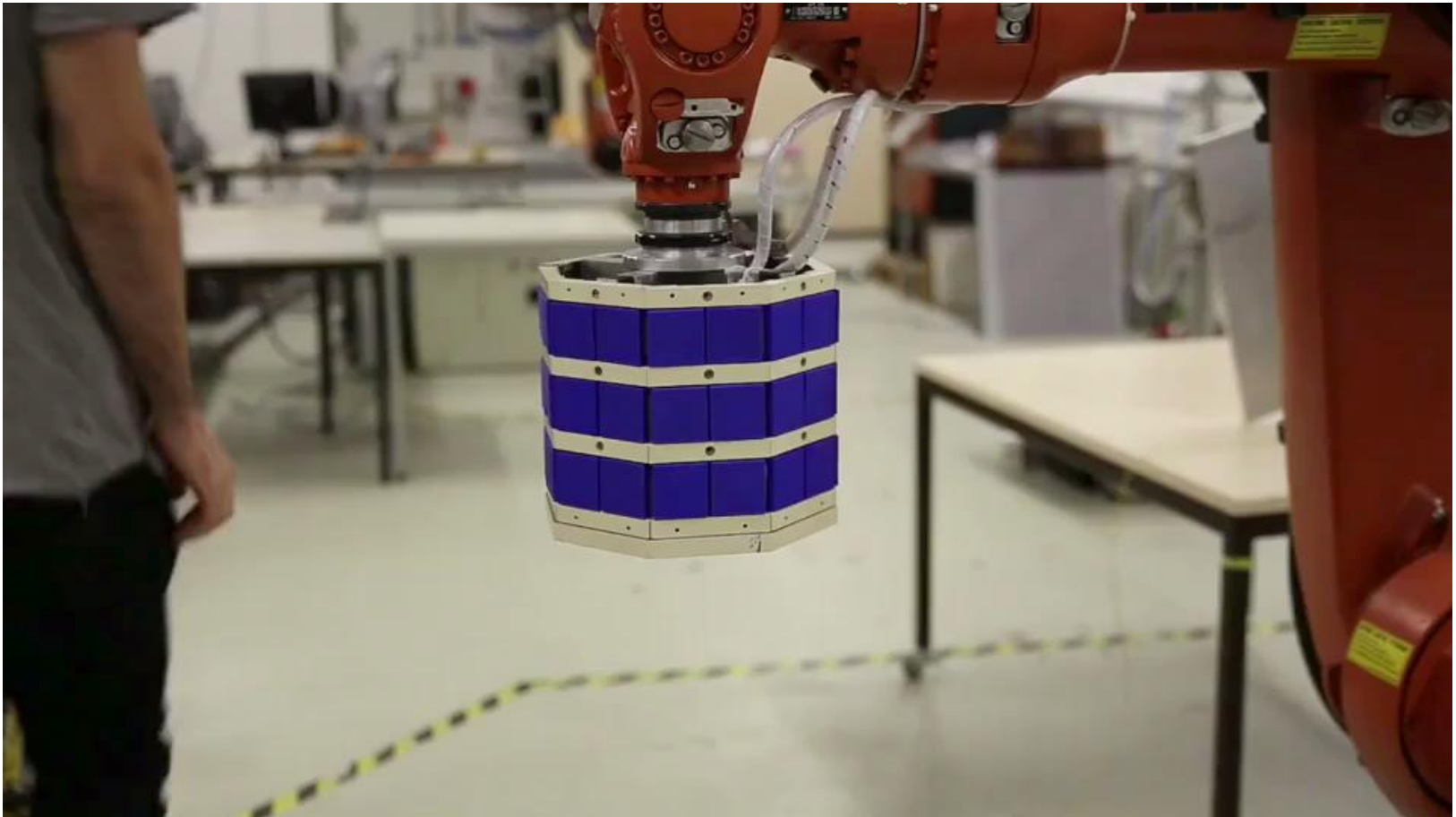
Example for chained modules: 2-Hand-Tracking



S. E. Navarro, M. Marufo, Y. Ding, S. Puls, D. Göger, B. Hein, H. Wörn, „Methods for Safe Human-Robot-Interaction Using Capacitive Tactile Proximity Sensors“, in Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Tokyo, Japan, 2013

[Award – Finalist: JTCF Novel Technology Paper Award]

Testing the set-up



- Quick demo of proximity-based positioning of the end-effector

Proximity Servoing using CPTS in Gripper



S. E. Navarro, F. Heger, F. Putze, T. Beyl, T. Schultz, B. Hein: „Telemanipulation with Force-based Display of Proximity Fields “, in Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Hamburg, Germany, 2015

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