

# Thermal 3D Mapping for Saving Energy



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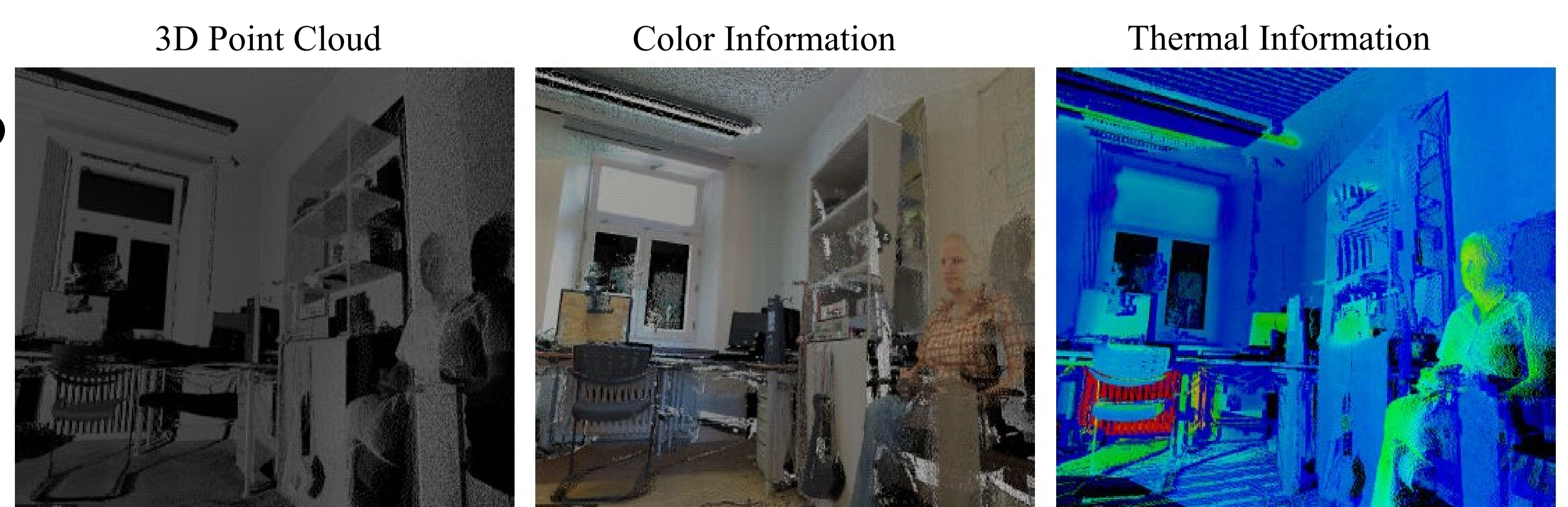
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## Challenge

- ★ Heat and air conditioning losses in buildings and factories lead to a large amount of wasted energy
- ★ The Action Plan for Energy Efficiency of the European Commission estimates that the largest cost-effective energy savings potential lies in residential (~27%) and commercial (~30%) buildings [1].
- ★ Create precise digital 3D models of indoor environments and solve the SLAM problem with 6 DoF in the sensor pose in conjunction with scan pose planning
- ★ Meaningful visualizations for off-line inspection

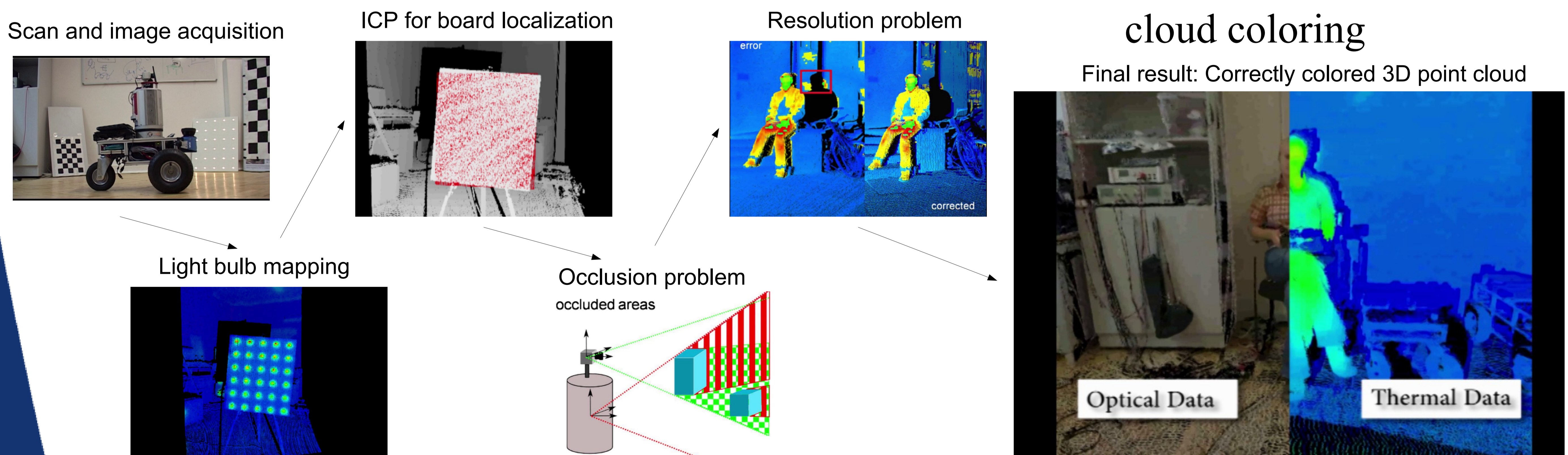
## Approach

- ★ Thermal imaging is state of the art in recording energy related issues of buildings.
- ★ Terrestrial laser scanning has been used for years to create 3D models and to solve the SLAM problem
- ★ Combination of these two technologies and Vision
- ★ Solve the calibration, occlusion and (low) resolution problem



## Results

- ★ Calibration using a checker and light bulb board pattern & sophisticated point cloud coloring



## Partner & Funding

- ★ Advanced Control Team at the Department of Control and Computer Engineering, Faculty of Electrical Engineering and Computing, Unska 3, HR-10000, Zagreb, Croatia
- ★ LARAS - The Lab for Robotics and Autonomous Systems is a research laboratory within the Department of Automatic Control and Electronics at the Faculty of Electrical Engineering, The University of Sarajevo, Bosnia
- ★ Automation group  
Jacobs University  
Bremen, Germany



## References

- [1] Commission of the European Communities. Addressing the challenge of energy efficiency through Information and Communication Technologies. Communications from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, COM(2008) 241 final, May 2008.
- [2] <http://www.faculty.jacobs-university.de/anuechter/thermalmapper.html>
- [3] <http://www.youtube.com/watch?v=K-1GaGKdNcg>
- [4] <http://www.youtube.com/watch?v=TPoCebERySc>