

# Bachelor Thesis Announcement

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## Evaluation of a lightweight debugging platform for mobile sensor networks

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### Introduction

Cyber-physical systems (CPSs) are networks of wirelessly connected embedded devices that monitor and affect their environment. They are becoming progressively pervasive in our society. The evolution of the technology allows building very small and light nodes for these systems. It becomes then possible to add them to mobile platforms, including free ranging robots and drones, for instance. These new capabilities lead to new challenges in the validation and troubleshooting of the behavior of these systems.

The goal of this thesis is to evaluate a debugging platform developed in our group that is lightweight enough to be added to the individual devices composing a CPS (in this case, a wireless network of smart sensors) in order to:

- program a device,
- collect data during normal operation (for debugging or performance validation),
- interact during system operation to affect the resulting behavior (for testing or optimization).

To achieve that, the debugging platform also offers a wireless interface to monitor and control the system device attached to it, effectively replacing traditional wired debugging solutions. This ultimately results in a debugging support network, which is decoupled from the monitored system, yet flexible enough to support the variety of deployment scenarios envisioned for CPSs. At the same time, however, the wireless interface and the resulting debugging network can support the exchange of only a reduced amount of information. The resulting network capacity and delay of the debugging support network must then be evaluated in order to understand the scenarios that the platform is able to support.

### Objectives of the thesis

In summary, the work for the bachelor thesis entails:

1. Familiarization with the state of the art on debugging CPS/wireless sensor networks and with the testing infrastructure available at our group
2. Identification of the evaluation metrics necessary to characterize the wireless interface of the debugging platform
3. Implementation of the solutions necessary to monitor the identified metrics
4. Evaluation of the performance of the debugging platform in different system setups
5. Documentation and oral presentation of the results in the NES colloquium

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