Thesis Title: **Object security for connected vehicles and IoT**

**Description of the Unit**

The Security Lab group at RISE SICS is among the largest cybersecurity research groups in Sweden. The lab is involved in multiple research projects, funded by both Swedish and European funding agencies and Swedish industry.

**Thesis Description**

Today's vehicles are becoming increasingly connected. The communication environment in the automotive sector is heterogeneous, with various software stacks coexisting and various medium of communication involved. The automotive sector has had their own standards, such as C-ITS, while the communication endpoint might be a regular internet device. Hence secure end-to-end communication is challenging.

It is desirable to enable secure communication also for low end devices, such as sensors with limited hardware capabilities or battery life, resulting in hard constraints on processing power, memory, and radio. Consequently, using current heavy-weight security solutions with constrained devices is not trivial and the process needs to be adapted to the limitations of the specific ecosystem.

Two motivating examples are: sensors for container tracking of sensitive goods and passenger health sensors, both use cases where the owners have interests in keeping their data secret while being sent over the network.

There are recent standardisation efforts, such as the OSCORE protocol that try to solve this with an application-layer encryption scheme that is very resource efficient.

We have an architecture and a workflow for OSCORE communication that would enable full end-to-end security for embedded devices, that could be used both for devices compliant with the vehicle C-ITS standard and other IoT devices.

RISE SICS will provide background information and a certain amount of code libraries. The tasks of the Masters student for this thesis are:

- Study the proposed designs for object security for vehicle communication, and related standards
- Implement standard based object security for connected vehicles, and evaluate relevant communication scenarios on target hardware
- Document the results as a thesis document

**Competence**

We are looking for a bright MSc student with knowledge of cyber security, who has fulfilled the course requirements. Good programming skills are required, preferably with embedded software experience, as is good spoken and written English.

**Application**

Applications should include a brief personal letter, CV, and recent grades. Candidates are encouraged to send in their application as soon as possible. Suitable applicants will be interviewed as applications are received.

**Start Time**  As soon as possible

**Location**  RISE SICS Kista, Stockholm

**Contact**  Simon Bouget  Security Lab, RISE SICS  Joel Höglund  CSL, RISE SICS
Vehicles are becoming increasingly connected. Achieving end2end communication for the automotive industry is a challenging task that this thesis will tackle.