Summary

The first objective of this project is to propose a framework to model complex, industrial-sized systems as extended finite automata (EFA). The focus is on modelling the possible and desired behavior separately as plants and requirements, making the design process and the models intuitive. An ASML wafer scanner controller called 'logistics controller' is used as an industrial case. To meet this objective, the following tasks are carried out. Firstly, a framework for requirement modeling is proposed. Four types of requirements are identified. For each type an intuitive way to formally model the requirement is proposed. One type is most intuitively modeled as EFA. To model the others, formal expressions are proposed, along with a translation of these expressions to EFA. Secondly, the possible and the desired behavior of the logistics controller are identified and modeled as plants and requirements.

The second goal of this project is to synthesize a supervisor from these models using supervisory control theory. For the case Supremica cannot complete Step 1, due to so-called event explosion. As an alternative, the BDD-based approach of Miremadi et al. is explored. However, only an experimental release of the supporting tooling was available, for which the results of the case are not completely trusted. It is recommended to further explore the possibilities of this approach, especially when a stable version of the tooling is available.