(Abstract in English)

**Towards Precision and Reliability in Autonomous Agricultural Robots**

This dissertation investigates challenges and solutions within the application and commercialization of autonomous agricultural mobile robots - specifically those targeted at providing autonomous, unsupervised lawn-mowing services for larger areas; an application area where many solutions already exist on a smaller consumer scale. The work is based on an autonomous grass-cutting robot, AutoTurf, meant for use in public parks and any other areas where large grass turfs exist, which the partner company SIDIS is currently developing. These turf-areas are today serviced by riding mowers where the use of smaller robotic lawnmowers is not sufficient or desired.

In terms of methodology, the work comprises applied research and development with its base in the application and development of the AutoTurf robot. In a broader sense, the work is closely related and applicable to the application fields of autonomous and precision agriculture.

Three areas of interest are investigated in the thesis: complete coverage path planning, positioning & perception and path-control, which relate to the three challenges of guidance, navigation & control, or expressed as statements "where do I want to go"? “where am I?” and "how do I get there?". For each of the areas of interest, an analysis has first been carried out, then a solution for the AutoTurf robot has been developed, implemented, tested, and discussed.

The presented solutions have been adopted and proven, by their use on the AutoTurf robot, but future work is possible concerning further optimization and additional functionality, particularly for the integration of the solutions, and the performance of the developed path-control solution.