

*Freight transportation is essential for most economies. The main focus of this work is on forwarding agencies handling less-than-truckload freight. In general, direct transportation from origin to destination would be too expensive. Therefore, the main idea is to consolidate enough small shipments to efficiently conduct transportation for the majority of the distance. In preparation of this transport it is necessary to pick up commodities from different customer locations in the origin region. At the transshipment point consignments with the same destination region are grouped on one truck heading for this region. Upon arrival they are transshipped again on smaller trucks and distributed to the customers.*

*Nearly every transshipment point collects as well as rolls out goods. Thus, typical forwarding agencies perform pickups as well as deliveries conjoined on the same vehicle. They have to cope with hundreds of pickups and deliveries each day and dozens of vehicles are necessary to service the customers in the local region. The performance is mainly influenced by two dynamic factors: First, due to developments in information and communication technology, the agencies receive pickup orders increased shortly before the actual pickup. Second, unexpected traffic situations are endangering the scheduled pickups, though traffic information is increasingly available. Surprisingly this information is hardly used in the forwarding industry, even though vehicle locations are available in realtime via global positioning systems. The consequence is that these companies are fighting lateness of shipments and poor utilization of vehicles. Therefore, the objective of this thesis is to develop an intelligent planning system based on mathematical optimization heuristics to assist forwarding agencies in routing vehicles efficiently.*

*This thesis introduces an intelligent planning system based on a tabu search. The successful anticipation of travel times and a method to integrate unknown customer orders into the route planning are described. Using this system allows forwarding agencies to avoid late deliveries and to route vehicles efficiently.*