AMATRAK - Autonome Multiagenten Transport Koordination

**KeyWords:**
ICT, transport optimisation; B2B and B2C solutions, cooperation; Transport management, fleet management;

**Description:**
AMATRAK has the goal to reduce freight traffic by using intelligent control and by charging freight vehicles in the procurement and outbound logistics efficiently. Based on a multi-agent technology, the mileage is reduced by an intelligent route planning and disposition. At the same time the average truck load is increased by bundling.

**Benefits:**
- Savings of 6-11% in vehicle kilometers
- Savings of 7-12% in vehicle utilization
- Societal benefits (better use of existing infrastructures)

**Starting Point/Objectives/Motivation:**
The main motivation was made up by the consideration that customers are continuously demanding for more flexibility. Secondly, the operators are seeking for saving opportunities by using their expensive rolling stock in more efficient ways.

The common practice before the implementation of AMATRAK was a full time employed dispatcher executing the tasks of route planning and vehicle assignments. AMATRAK allows saving a considerable amount of fuel and reduces CO2 emissions in the logistics industry, thereby making it more sustainable.

This increases the competitiveness of road freight transport in supply chains in comparison to or in combination with rail and waterway transport. Different shipments will be consolidated into one shipment, which will reduce the price of road transport part of supply chains.

The implementation of the practice is possible for every road forwarder, without considerable associated costs (apart from the licensing of the geo positioning software). Since this solution is based on autonomous agents, while the dispatcher can use a guided software in his efforts to find the best routes for their shipments, it does not even require training of employees, making the introduction very easy. On the basis of methods of distributed artificial intelligence, a software-based, self-controlling multi-agent system has been developed. A multi-agent system is a system of several different specialized units, which collectively solve a problem.
In AMATRAK, the multi-agent system is capable to make route planning and vehicle assignment in real time. Changing customer order data and vehicle conditions can be incorporated dynamically. The ‘agents’ implemented are based on the JADE freeware, which is already in use internationally.

Three types of agents:

dispatcher agent – software installed on PC
vehicle agent – found in handhelds in vehicle
department agent – software installed on PC

The agents are software based self administrating, although the physical dispatcher always has the ability to choose between different software based agents.

The agents automatically calculate and display the different possible routes calculated as being feasible, whereas it is going to be the dispatcher who can choose and control the results in the end. The different results from which the dispatcher will be able to choose are going to be displayed on a guided user interface of a software introduced for this purpose (modified Active-M-Ware software). Technical specifications of the software were developed by procuring material such as existing scientific studies and literature from the DIN Institute, the TIB of the University of Hannover, the State and University library of Bremen and the University library of Oldenburg.

AMATRAK can be transferred to other geographical areas and to other actors and industries.

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More information:

Transport mode or supply chain elements:
- Trucks
- Delivery vans
- Packing
- Loading
- Transport
- Warehousing
- Transhipment
- Storage

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