MOSCA (Germany)

Topic

Intelligent Transport System / Freight and city logistics

Summary

Decision Support System (DSS) For Integrated Door-To-Door Delivery: Planning and Control in Logistic Chains (MOSCA). MOSCA provides a set of computer tools to assist the transport operators in planning their transport services.
This case study was collected in the framework of the Bestufs project.

Case Study

Introduction

The approach integrates the urban goods flows and their related infrastructure within advanced urban transport models allowing authorities to plan, assess and control freight transport according to their needs.

Basic facts

The key objective of the MOSCA project is to provide a set of tools for improving the efficiency of door-to-door transport of goods in urban areas.
Private transport operators take advantage out of the model by accessing actual traffic and other information (e.g. “works ahead” on roads or closed lanes) but also out of other advanced possibilities for an improvement of their knowledge like e.g. the delivery time windows of their clients.

Users and stakeholders

Transport operators, carriers, shops, citizens/private customers, delivery services, etc.

Implementation set-up

Two of the modules have been tested at the German test region Stuttgart:

The MOSCA-SHOP module represents an information platform which allows on the one hand the integration of loading and unloading time windows of shops and additional information relevant for goods transports via an open “shop-owner” Internet user interface, and on the other hand time slots (defined according to this information) can be booked by transport operators via the “operator” internet user interface. An interface to tour planning tools is foreseen.
The MOSCA-SHOP module provides information on free dock access and allows booking of access time slots. It is used by carriers to plan their service anticipating waiting time at the shops loading dock. On the input side the carrier enters requests for dock access bookings. Shops give their accessibility information and instructions

for carriers to MOSCA-SHOP. MOSCA-SHOP is auctioning these timeslots through a so-called "Dutch-auction" in which the values of the corresponding access time slots decrease the closer the time gets to the actual delivery time. By doing so carriers can virtually "buy" safety by booking time slots sooner than before.

The MOSCA-NET module is also an information platform. It offers an Internet user interface where citizens/customers can integrate their personal time patterns and get information with regard to the status of their orders. The authorised delivery services get access to the time patterns for a better planning of their delivery tours.
The MOSCA-NET belongs to the carrier-customer collaboration category. It receives information about delivery locations, delivery profiles and time windows from B2C, i.e. private customers.

Results

Testing of MOSCA-SHOP in the city of Stuttgart:

Information on the ramp access situation of shops in the city centre of Stuttgart have been collected in order to assess on one hand the general ramp access situation in the city centre of Stuttgart and on the other hand to find out the reaction of shops with regard to the "dissemination" of these information. It can be concluded that the stores' willingness to provide any information about the prevailing delivery situation was rather low.

The data of the shops (opening times, capacity, average duration of loading and unloading, average number of arrivals per day) were integrated in the MOSCA-SHOP data base via the MOSCA-SHOP web page. A real auctioning of time slices could not be realised within the project.

This test showed that:

- The stores' willingness to provide any information about the prevailing delivery situation was rather low.
- The integration of the data of the shops in the developed user interface is possible without any problems.
- The auctioning (from the transport operators' side) could not be tested, but the internal discussion of the concept showed that the implemented Dutch-auction might have to be replaced by another auction concept.
- The solution can be extended to a general parking booking system for commercial vehicles (this was tested in the MOSCA test site Lugano).
- Final conclusion: the technical solution is available but the use of the system and the possible positive effects depend heavily on the user acceptance (in these cases shops).

Testing of MOSCA-NET in the city of Stuttgart:

For a reasonable generation of time patterns, groups with homogeneous behaviour in Stuttgart, as they exist in the traffic model (MobilistNet), have been analysed. The potential delivery locations "at home", "work place", "service station" and "pick-point" (public transports) have been considered and according addresses in the Stuttgart area have been selected. The addresses have been derived from a city plan where the spatial repartition of the delivery locations has especially been taken into consideration.

The active tests showed that people seem to be reluctant to specify time-patterns for more than one week. The problem is to commit oneself to specific time patterns as the exact course of the day cannot always be planned ahead. A backup address like a pick-point or a service station where the goods could be delivered to would be ideal.

The delivery addresses allow to reach the customer for 5 up to 21 hours a day, requiring a 24 hours a day commitment from the parcel services. These number of hours when the customer can be reached decreases considerably when the parcel service's usual operating times are born in mind. This also shows the great advantages pick-points or service stations can provide as delivery stations.

The technical solution is available but the use of the system and the possible positive effects depend heavily on the user acceptance (in this cases private customer).

Future prospects and conclusions

For MOSCA-SHOP the work also focused on a first example realised within the MOSCA project. The next step will be to go towards a first scientific prototype. The intention is to promote the underlying ideas and create a wider awareness for both problem and solution approach.

For MOSCA-NET the work focused on a first example realised within the MOSCA project. The next step will be to go towards a first scientific prototype which allows further extensions. Further research is necessary in order to create a fully featured decision tool.

Web links

www.bestufs.net/

General project information:

www.idsia.ch/mosca

Internet pages of the two modules:

http://mosca.ifl.uni-karlsruhe.de:8080/MOSCANET/index.php

http://mosca.ifl.uni-karlsruhe.de/shop_index

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