

# CMA – COOPERATING MOBILE AGENTS

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CMA, Cooperating Mobile Agents, is a research project aimed at investigating possible solutions to the distributed control of systems of mobile entities, e.g. public transportation networks, transport and logistics operations and the flow of private transportation vehicles through a road network.

## 1. Background and Motivation

Systems involving vehicle fleets have for several years now employed IT-solutions to the monitoring and control of the fleet status and activity. The technologies used in these systems are typically a centralized server solution with wireless connectivity to each individual vehicle.

The adaptation of these technologies has up until recently been uncoordinated and involved many actors of diverse sizes. The momentum, though, is building up and the larger players and institutions, such as auto manufactures and the EU, are currently coordinating a joint infrastructure and service framework for the future of mobile (vehicle bound) IT.

## 2. Problem

The, previous, ad-hoc growth of the application area and subsequent realizations of systems supporting the fleet management and control, have given rise to complex, heavily centralized solutions. These rely on interrelated databases, dedicated application servers and point-to-point communications schemes such as GSM/GPRS/EDGE and the like. These, arguably evolved, architectures fail to support some important systems goals, notably: *dependability* and *scalability*.

Dependability is jeopardized in the sense that the centralized system hub is a single-point-of-failure and scalability is reduced as adding entities and/or functionality to the systems grows harder by the size of the system.

Also, the entities in the system often harbor a substantial computing power that is not used and the centralized communication give rise to hotspots.

The infrastructures envisioned by the main actors continue the path of the centralized system solutions while proposing standard interfaces to deal with many of today's shortcomings. In that process, though, they are also adding more functionality to the systems increasing their complexity.

## 3. Approach

We propose to search for solutions to fleet management systems that do not rely, solely, on centralized command and control but instead use distributed control mechanisms. The rationale is that by imbuing the respective mobile entities in the network with a level of

autonomy, turning them into active agents of the system, much of the system operation and control may be automated and distributed.

Automation reduces the human controller workload freeing resources to handle the less frequent but most complicated situations. Distribution reduce bandwidth to the central and facilitate robust operation in the face of communications problems. Data related to a specific situation stays “in the field” where high bandwidth, cheap, short range wireless equipment may be used and the computing power of the agents may be efficiently utilized.

The central questions of this project is which systems services are possible to cost-effectively distribute onto the fleet agents, what technologies are applicable and how to use them.

## 4. Results

The project is, as of March 2008 in its inception and definition phase.

## 5. References

TBD

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## PARTNERS AND STATUS

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Project leader is Per Söderstam.

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## PUBLICATIONS

None.