

# Police Practice and Information Technology

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**Abstract:** This paper describes a research project aiming to find design implications for information technology supporting police work. A field study of approximately 200 hours over a five-month period has been conducted. The findings are structured as three design dimensions that are used to propose an IT design.

## 1 Introduction

Policing is a complex setting to study for many reasons (Klockars 1985, Perlmutter 2000, Morgan 1997). Formal access has to be negotiated through the appropriate channels in the police organization, and informal access has to be earned by the researcher. That is, the researcher needs to build a trust with the police officers participating in the study. This is often referred to as access to the back stage, which is related to the content of conversation rather than locale. It is the hidden transcript, a discourse not meant to be publicly uttered or printed (Perlmutter 2000).

Information technology is currently used to support police work in several ways. For instance database systems are used to record crimes and there are different tools for analysis of stored data such as geographic information systems (GIS) (Adderly and Musgrove 2001, Pelfrey 2001). This paper describes the early phase of a research project aiming to find design implications for information technology supporting police work. The following research question is to be elaborated further in this paper:

What are the characteristics of police work in the field, and how can we design IT to support this work?

The structure of the paper is the following: the research approach is briefly described. Then the result is presented. The paper ends with a discussion and conclusions.

## 2 Research Approach and Methodology

The overall research approach applied is Informatics which is the design oriented study of information technology use, with the ambition to put that technology to good use, acting both on the technology and the organization of its use. The informatics discipline is described as: "...a theory and design oriented study of information technology use, an artificial science with the intertwined and complex of people and information technology as its subject matter" (Dahlbom 1996) and further as: "...a discipline tracking (leading) the development of information technology, with the ambition to put that technology to good use, acting both on the technology and the organization of its use." (ibid.).

In other words, the Informatics research discipline is concerned with a wide range of areas related to information technology, such as work practices, interface design, education, mobility and knowledge management. The core of the research approach is described in Dahlbom and Ljungberg (1998) as: "...the heart of informatics research, the idea generation phase. It can be followed by implementation and evaluation studies, testing the ideas, but such testing is of secondary interest only" (ibid.).

Another way of describing the Informatics approach is to define the outcome of such research. Ljungberg (1999) states that the four main results from an Informatics research project are: "... 1) computer enabled desired situations, 2) concepts describing generalizations of realized desired situations, 3) services programmed to realize desired situations, and 4) documentation of services and change projects" (p 102). A three-phase methodology described below has frequently been applied in Informatics research.

Field study - Ethnography (Hammersly and Atkinson 1995, Ferrell and Hamm 1998, Fetterman 1998) has for several years gained interest from IT researchers (Luff and Heath 1998, Bellotti and Bly 1996). Often informatics research has the character of quick-and-dirty-ethnography.

Design - Based on the analysis of the data collected, a design proposal is made and a demonstrator or prototype is designed and developed (Button and Harper 1996, Hughes et.al. 1994).

Evaluation - The prototype is evaluated in real-life context with potential users. The purpose is to validate and examine the positive effects and the drawbacks concerning the user group.

## 3 Results

200 hours of fieldwork during fall 2001 has resulted in an overall picture of how police work in the field is conducted and how the patrols are related to the dispatcher. The fieldwork was conducted in two settings; patrols with two officers in a patrol car (150 hours), and in the dispatcher central (50 hours). I rode with several different officers, and I observed several different dispatcher shifts. The field study is not presented at any length rather it is below summarized in three design dimensions. The field study was complemented with a series of five interviews with police supervisors. The interviews were informal and open-ended questions were asked about police practice and supervision and control of practice in the field. The interviews clearly gave the researcher a quite different view of the practice than the field study.

Argyris (1982) has emphasized the importance of differentiating "espoused theories" from "theories-in-use." The espoused theory is what people say they do; it's the official way of how the

program or organization operates. The "theory-in-use" is what really happens. Interviewing supervisory or managerial staff and administrators, and analyzing official documents, reveals the espoused theory. Interviewing participants and front line staff, and directly observing the program, reveals the theory-in-use. The resulting analysis can include comparing the stated ideals (espoused theory) with real priorities (theory-in-use) to help all concerned understand the reasons for and implications of discrepancies.

### 3.1 Design Dimensions

The concept of design dimensions is an attempt to capture the aspects of the practice that are important to balance in the design of IT support. Three dimensions are described below and exemplified with excerpts from the fieldwork.

#### Central authority vs. Local autonomy

The police work studied in this research is to a large extent based on calls, or orders, delivered from the dispatcher to the patrol. The patrol receives orders on events where the police are required. The order contains the nature of the event, the location and some background information if available. The dispatchers articulate the event as more or less important and acute. The patrol then decides how to get to the location, e.g., which route to take and at what speed.

"7610 We have a domestic at 21 Family Street, flat 4B. The neighbors said it is the second time this week, and we have been there before. Can you drive by there?"

The patrol negotiates on how to deal with the situation. Since the call is routine, i.e., it is not an emergency and the location of this particular street is clear, the patrol proceeds to scene. They solve the dispute and leave the apartment. Back in the car they send the status ready at the scene the dispatcher and starts to roll.

#### Reactive intervention vs. Proactive work

As contrast to the reactive intervention described above, much of the police work is conducted by just being present, i.e., proactive. Such situation occurred a week later. Driving slowly on a deserted street downtown 3.15 am Saturday morning one of the officer turns to me.

"You know, by just driving here this time of the night we might prevent some crimes, I mean maybe that guy [pointing at a young man walking on the side walk] is planning to brake into a car, but when he see us he might think that we will be back and therefore decides to not do the brake in."

#### Control vs. Support

This dimension can be exemplified by relating to the possibilities with GPS (Global Positioning System) and similar technologies. Navigations systems with maps and driving directions are gaining popular among many categories of drivers, e.g., truck and cab drivers, but also among everyday drivers. The dispatchers are equipped with electronic maps and when the events are registered they appear on the map in front of the dispatcher. By this, all dispatchers have an overview of the events currently going on. The dispatcher uses the map to give driving direction when necessary. The officers and the dispatchers are aware of how others use positioning systems and there are two main positions taken on this technology. Late at the dispatcher central, the operator I am sitting with this shift is a bit frustrated.

“I need a car [to send to an event] and I have no idea where the cars in the city currently are. With GPS in all cars, they would appear here on the map [points on the screen] and I could send the closest car instead of picking one in random. Usually I have a pretty good notion of where the cars are, but it is sometimes difficult. I think it is very important that we know where they are, both to be effective, and for safety reasons.”

Later when riding with a patrol car we talked about positioning.

“GPS and such stuff might be good, but I think I would feel like we are monitored and not able to do what we find suitable. It is important that we preserve the integrity, and our freedom to patrol as we find appropriate. I am not sure that the work will be better by having us as moving dots on a large map. Of course for safety reasons, but it should be in some other way. It should be possible with new technology.”

### 3.2 Awareness technology

How police officers act depends very much on the situation and the context. Obviously a hostile situation is dealt with quite differently from a friendly situation. A familiar context is less problematic than an unfamiliar. With the right information the situation can be properly handled. For officers it is important to know or be aware of the whereabouts of the partner and other officers in case of an undesired situation. This is true for both officers at the same scene, but it is also important to know how far backup is in case something goes wrong. With the three design dimensions as background a tentative application of position (GPS based) and awareness technology is proposed. The application is presented on a small display (see figure 3) in the vehicle with a list of the patrols on the shift, their call signs, how many officers in the patrol, their status (available, dispatched (occupied with event), or on break), and their proximity (relative distance to the other patrols).

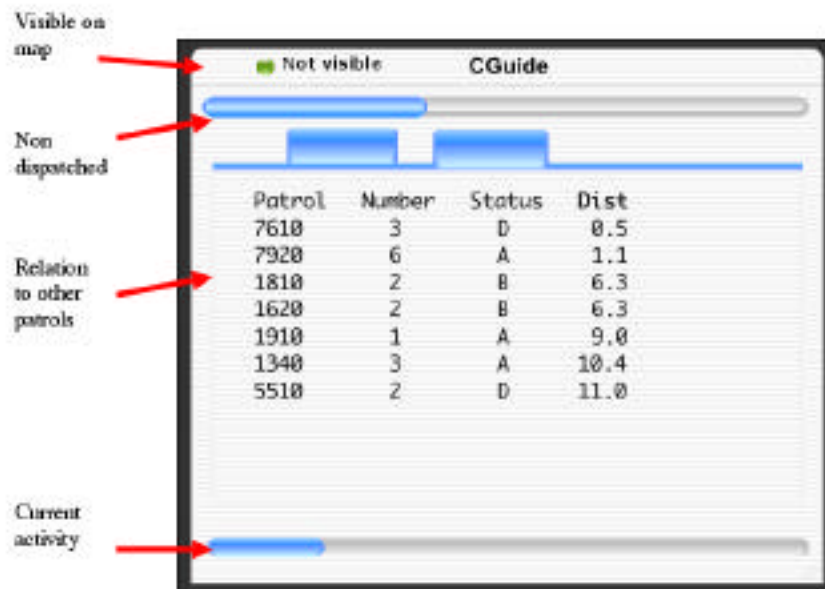
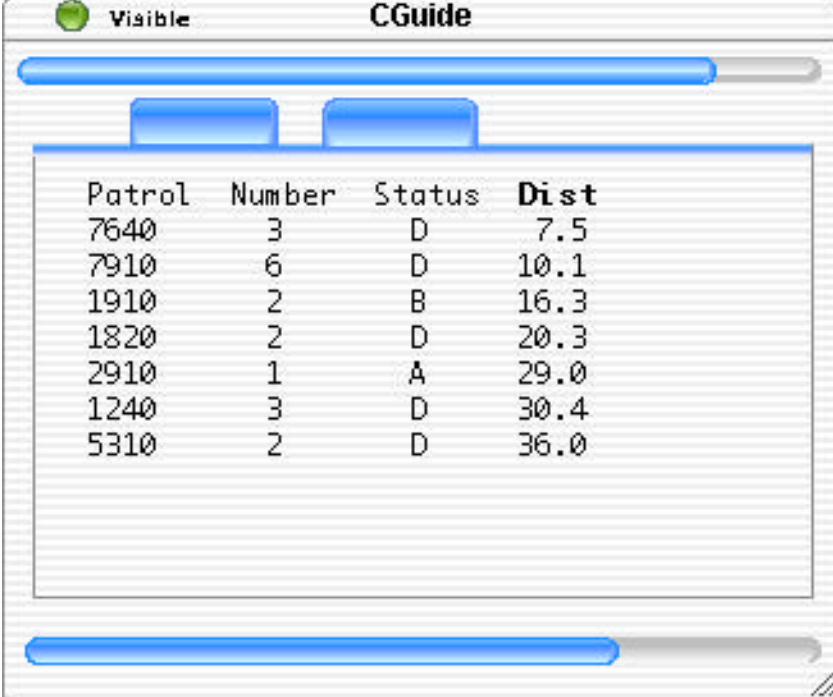


Figure 1: Interface for police awareness.

Figure 1 above show the proposed interface of an awareness technology for the patrol car. At the top there is an indication if the dispatcher currently is positioning the patrol on the dispatchers map. The top horizontal bar indicate “how many” calls that are not yet dispatched. This is to give the patrol an

indication of the current situation at the dispatchers central. Similarly the bar at the bottom indicates the activity in the current area of the patrol. Driving around being proactive the officers are aware of the other patrols. When called to an event the patrol leaving the vehicle take a quick look at the display and get proximity and status information concerning their colleagues. With this information they can make quick decisions on how to act if the situation at the call becomes problematic, see figure 2 for an example where the officers probably should take on a low profile.



Patrol	Number	Status	Dist
7640	3	D	7.5
7910	6	D	10.1
1910	2	B	16.3
1820	2	D	20.3
2910	1	A	29.0
1240	3	D	30.4
5310	2	D	36.0

Figure 2: This example shows that there are many non-dispatched calls, there are no patrols in the vicinity, and it is quite busy in the area of the patrol. With this information the patrol can act more appropriate than otherwise.

## 4 Discussion

The design dimensions are proposed to be useful in designing IT support for police work. The first dimension shows that police work in the field is in one way controlled by the dispatcher since they distribute the calls among the patrols on duty. At the same time, each patrol is acting autonomously when at a call, and in between calls. The proposed application gives the dispatcher information concerning the positions through GPS, but more importantly it gives the patrol information otherwise difficult to obtain quickly. Both the dispatcher and the patrol use the technology. The second dimension, going from a proactive state to a reactive state is common. A call about a stolen car will instantly involve a number of patrols. The awareness of the others can make the chase of the stolen vehicle more efficient, and safer. The third dimension, in case of such situation the dispatcher and the patrols cooperate in the coordination of the involved patrol cars. The proposed design is aimed for a

metro area where there are several patrol cars coordinated by the dispatcher. In the countryside with few patrols covering a vast area this type application will not be as relevant.



Figure 3: The awareness system as described above can be implemented on a car platform. Patrol cars with computers installed are offered to the police districts. This is however a substantial investment as it is a significant cost per vehicle.

## 5 Conclusion

The research question raised in this paper was: What are the characteristics of police work in the field, and how can we design IT to support this work?

The characteristics of police work, from an IT design perspective, was structured as design dimensions. The design dimensions capture crucial aspects of police work from both a espoused theory and theory-in-use perspective. The proposed application is aimed to support the work described. The contribution of this research is the concept of research dimensions as both conceptual and analytical tools to expand the three-phase approach described in the paper. Further research will evaluate the proposed design.

## 6 Acknowledgements

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