

A BEHAVIOURAL EVALUATION OF THE
VANCOUVER POLICE DEPARTMENT'S
MOBILE RADIO DATA SYSTEM

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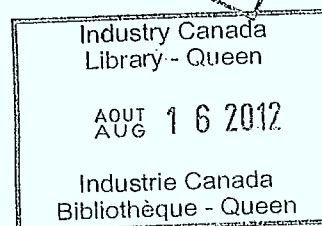
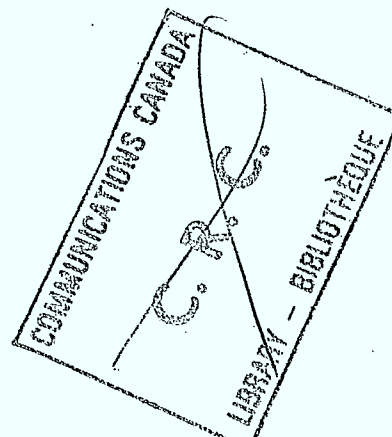
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I. Executive Summary

As of approximately July, 1980, the Vancouver Police Department was the first in Canada to have access to Mobile Radio Data technology. There had, however, been similar systems implemented in the United States and Europe prior to the Vancouver system, and at least one other Canadian police department (in Ottawa) has since obtained similar technology. The Vancouver Police Department's (VPD's) system is called MRDS -- the Mobile Radio Data System -- and its most obvious manifestation to the officers who use it is the small computer terminal in their patrol cars.

Through MRDS, officers are able to call up one of eight different "forms" or "fill-in-the-blank" types of requests. These "forms" enable access to a good portion of the Canadian Police Information Centre (CPIC) data base, which gives officers information about persons, vehicles, and other property. The persons query, for example, will initiate a response indicating whether an individual has any wants or warrants outstanding, and/or whether the person is currently on probation or parole. The vehicle query will indicate whether a given car, for example, is stolen, and whether the registered owner of the

vehicle is wanted and/or considered violent. The property query is used with items which have serial or other identification numbers, to determine whether they have been listed as stolen. MRDS also gives officers access to files maintained by the Government of British Columbia concerning driver's license status, registered owners, and vehicle plate numbers.

Three other "forms" do not access data bases, but, rather, allow officers to communicate with the dispatcher and/or one another. One form is used to sign on to the system, a second is used to report status changes, and the third is for actual messages. Messages initiated by a patrol unit can be sent to the dispatcher or up to five other units; messages initiated by the dispatcher can be sent to any or all units. There are currently 55 VPD (black and white) patrol vehicles that are MRDS-equipped. Note that the minimum and maximum number of black and white patrol vehicles on the road at any given point in time are 40 and 120, respectively.

As our title suggests, the research reported here involved a behavioural evaluation of the Vancouver Police Department's (VPD's) Mobile Radio Data System (MRDS). In particular, three main issues were addressed: (1) What attitudes did VPD personnel hold toward the system now that they have had some experience with it?; (2) How was the system being used, and what parameters affected system use?; and (3) What implications did MRDS hold

(i) for policing; and (ii) for radio spectrum utilization? Toward these ends, a multi-methodological approach was utilized in which the primary data sources were: (1) A structured questionnaire completed by 205 patrol officers at VPD; (2) A semi-structured interview schedule, designed to supplement the questionnaire responses, that was administered to a selected subsample of approximately 90 patrol officers; (3) Less formal interviews with senior administrative VPD personnel, and with the dispatchers in the communications room; (4) Structured observation of the system in use, in which four research assistants participated in 88 separate 'ridealongs', each of approximately four hours duration, during regular patrol shifts; and (5) Archival data supplied to and, in some cases, specifically generated for us by the VPD, regarding MRDS and voice channel usage.

Regarding attitudes toward MRDS, we found that senior administrative personnel and patrol personnel were, overall, highly positive about the system. A full 93% of patrol officers, for example, agreed 'strongly' or 'somewhat' to the statement that "Overall, I like MRDS". There were many reasons for this, but, in general, officers liked the independence it gave them (from concerns about monopolizing voice channels, from dispatchers, and from monitoring by fellow officers), felt it helped them to be more efficient, increased their job satisfaction and, to some extent, made policing safer. Other

officers, while still positive overall about the system, expressed some concern that many officers were being seduced by the ease with which information could be obtained, to the point that they were becoming overly dependent on the system and allowing it to make decisions for them. In this sense, MRDS was seen as potentially creating a sort of 'buffer' between the police and the community, with the result that these officers were not developing the "sixth sense" or "intuition" about situations and people which were seen as so important to effective policing. To that extent, MRDS was also seen as potentially reducing police safety.

In observing system use, we found considerable variability in the extent to which individual officers utilized the system, which was in part explained by variability in the attitudes alluded to earlier. In general, MRDS use increased in the evenings and on weekends (when more police are on the road and there is more to occupy them), although many officers saw MRDS as providing a constructive way to spend otherwise 'lull' time. MRDS was heavily used for its query facilities, particularly the 'vehicle' and 'person' queries. The 'narrative' form was used somewhat less, and the 'property' query and 'status' function were virtually never used. In general, MRDS was the medium of choice when one was 'being investigative' and/or 'killing time'. Lest it be overlooked, voice communication was also valued highly by officers, particularly for its efficiency for

extremely short and trivial messages (eg., reporting status changes) and extremely important interactions that required immediate response, undivided attention, and where affect (emotional tone) provided important cues (eg., officer in trouble; in pursuit). The constraints of the study did not allow us to assess whether MRDS did indeed facilitate officer efficiency, although nine arrests occurred during the observational period which, in the judgement of our observers, were directly attributable to MRDS, ie., they would not have occurred otherwise.

We identified several different implications of MRDS on policing, although not all of these could be assessed directly in the context of the current research. With respect to the voice channels, there was some evidence to indicate that air time was less cluttered since the advent of MRDS, although (1) there is still a constant chatter during peak busy hours; and (2) officers now appear to take advantage of periods of reduced air occupancy to use the radio for communications they may previously have withheld. As a result, voice channel utilization is still substantial and, while the advent of MRDS may have negated the need for more voice channels, it is unlikely at this point that VPD would feel positively about getting by with less.

A most important set of implications that we could identify but not assess directly concerned the potentially changing

nature of interactions between the police and the community, some of which were alluded to earlier. Completely bypassed, but no less important, are issues concerning the public's perception of police access to information. Both of these were seen as important avenues for further research.

It also seemed clear that the advent of MRDS would create organizational impacts within VPD, eg., to the role of dispatchers. Our informal interviews with several dispatchers revealed some antagonism on their part to the changes which MRDS has introduced, although it is not entirely clear at this point what the basis of this antagonism is, nor what implications it might have.

Finally, in attempting to further enhance the utility of our report to VPD and DOC, some preliminary suggestions were made concerning possible changes in training procedures, as well as directions which might be followed in future research. It is our strong hope, for example, that, in the event some other police department expresses a desire to implement MRDS, DOC will seize upon the opportunity to perform a more complete, longitudinal evaluation, which commences well before the system is actually implemented.

II. Introduction

It is not surprising that the microchip has brought changes to policing which parallel those that have occurred in the broader society. The burgeoning acceptance and implementation of computing systems in policing has been well documented in the United States by Kent Colton of the Joint Centre for Urban Studies of MIT and Harvard University. In two national studies, Colton (1972,1975) described the growing trend for computers to be used for management and personnel functions, computer aided dispatch, and, more recently, for criminal investigation and records. As one might expect, these uses were first seen in national police forces such as the FBI, followed shortly thereafter by implementation first in larger, and then progressively smaller urban centres. At the time of his 1974 survey, Colton (1975) found that every police department in a U.S. city of greater than 500,000 population was using a computer, as were 70.8 per cent of departments in cities of 100,000 to 500,000 population, and 44.2 per cent of departments in cities of less than 100,000 population. These percentages were significantly greater than were observed in his earlier study (Colton,1972), and one could only expect that they have increased further or peaked in the nine years which have passed since the most recent data were gathered.

But of all these computer developments, the one of greatest interest to us concerns the advent of police information systems with real-time access. The FBI was the first in North America in this undertaking and, in 1967, established the National Crime Information Centre (NCIC). In Canada, the RCMP's Canadian Police Information Centre (CPIC) came into existence in 1972. In both cases, the systems gave an ever growing number of police departments access to up-to-date information concerning wants and warrants on persons, and on stolen vehicles and other property.

The growth of NCIC and CPIC has involved the development of police information systems on two dimensions. First, these systems have attempted to remain up-to-date with ever growing amounts of information. But second, and more important, their growth is synonymous with greater and greater access to the information base. It is only within the last few years that this spread of access has taken a significant new twist. While 'access' formerly implied access by police departments to CPIC or NCIC information, the 1970's saw the decentralization of access beyond the police departments themselves to their officers on the streets. No longer would officers on patrol have to request that their dispatchers query on their behalf; now they could do it themselves.

Mobile data terminals made their first appearance in the United States. Numerous articles in police 'trade' magazines offered primarily anecdotal accounts of these systems and their potential.¹ All spoke enthusiastically about their systems, and went on at great length to describe advantages such as greater police effectiveness, decreased radio congestion, greater police safety, greater communications confidentiality, and speedier response to information requests.

Mobile data terminals made their Canadian debut in Vancouver, British Columbia, in the late 1970's after several years of development by the Federal Department of Communications. The exact date the system was inaugurated seems elusive. Dawson (1982) reported in the R.C.M.P. Gazette that the first arrest attributable to the Vancouver Police Department's (VPD's) system, entitled MRDS (Mobile Radio Data System), came on 24 December 1978. Yet, he also noted that installation of the system was not accepted by the VPD until March, 1979. On the other hand, an internal memo we acquired from VPD² alluded to 12

¹ See, for example, Gillam's (1973) article in Government Data Systems which described pilot testing of mobile data terminals in Kansas City, Nashville, New York, and West Palm Beach; Kellam's (1974) article in Law and Order describing the system in Virginia; the Florida Sheriff's Association's (1975) article in The Sheriff's Star on a system in Tallahassee; McKim's (1979) article in The Police Chief concerning the Detroit system; and a short reference in Colton's (1975) Municipal Year Book article regarding the system in Oakland, California.

² From Police Constable S. Cunningham of Planning, Research and Inspections, to Inspector J. Crich, entitled "MRDS Evaluation", dated 82-10-27.

July 1980 as the implementation date. In any event, it would appear that implementation was a gradual process, with July 1980 being the date at which the system was fully operational. As of this writing, 55 VPD patrol cars are equipped with MRDS.

For the uninitiated, the most obvious manifestation of MRDS is in the form of a computer terminal in VPD patrol vehicles. The terminal is a miniaturized one with full keyboard and CRT screen, and is swivel-mounted at dash level between the driver and passenger seats.³ Through the terminal, officers are able to call up one of eight different "forms" or "fill-in-the-blank" types of requests. This gives them immediate on-line access to a good portion of the Canadian Police Information Centre (CPIC) data base, which supplies information about persons, vehicles, and property.⁴ Officers also have access to Government of British Columbia files that contain information concerning driver's licence status, names of registered owners, and vehicle plate numbers. Finally, three other "forms" do not access data bases but, rather, allow officers to communicate with the

³ For an excellent colour photograph of an MRDS terminal in a VPD vehicle, see the December, 1982, special issue of the National Geographic concerning the microchip revolution.

⁴ The person query indicates whether an individual has warrants outstanding, and/or whether he/she is currently on probation or parole, and/or whether the person has been convicted of a violent or sexual crime. It does not, however, provide detailed criminal histories. The vehicle query reveals whether the vehicle has been reported stolen, and/or whether the registered owner is considered violent. The property query allows one to determine if an object (that has a serial or other identification number) has been reported stolen.

dispatcher and/or one another in complete confidence. One form is used to sign on to the system, a second is used to report status changes, and a third allows one to send actual messages. Messages initiated by a patrol unit can be sent to the dispatcher and/or up to five other patrol units, while those initiated by the dispatcher can be sent to any or all units. Note, however, that MRDS was not developed to replace voice channels in this message capability, but rather to divert some voice activity and thereby maximize voice channel efficiency.

There is no doubt that senior administrative personnel within the VPD are pleased with the system, and the reasons for their positiveness are similar to those reported above regarding the mobile terminal systems in the United States, ie., greater police effectiveness, reduced radio congestion, greater police safety, greater communications confidentiality, and speedier response to information requests.

Yet it is clear that a system like MRDS required a more thorough evaluation than the anecdotal reports of senior administrators.⁵ The system was the first of its type in this country and, in all probability, represents the 'wave' of the

⁵-----
This is not intended to belittle or detract from the importance of the evaluations of senior administrators at VPD, but rather to affirm that a comprehensive evaluation must include but go beyond those reports, particularly to the point of including those persons who use the system on a daily basis.

future' in Canadian policing.⁶ Consequently, the time was appropriate for a systematic evaluation of MRDS to more thoroughly understand its strengths, weaknesses, and implications for policing. We laud both the Federal Department of Communications and the Vancouver Police Department for their appreciation of that perspective, and hope that the evaluation we have undertaken will be informative to both them and other interested observers.

Evaluation Overview: Objectives

Our evaluation of MRDS had three primary foci which we attempted to address. These included:

1. Attitudes regarding MRDS use. What expectations did officers have about the system? How do they feel about the system once they have had an opportunity to use it? What strengths and weaknesses do officers perceive in the system now that they are experienced with it? How would officers compare MRDS and radio?
2. Actual MRDS use. For what purposes and in what situations is the system being used? To what extent and for what reasons is its potential not being fully realized? In what way and

⁶ Since the advent of MRDS, at least one other Canadian police department, in Ottawa, has implemented a similar system.

to what extent has the introduction of MRDS affected constables' communication patterns? What factors affect the quantity and quality of MRDS use?

3. Implications of MRDS use. To what extent has the introduction of MRDS affected not only the communicative behaviour of officers on patrol , but also their conception or mode of policing? To what extent has MRDS had organizational impacts within the VPD? In what ways and to what extent might the advent of MRDS have implications for radio spectrum utilization?

These represent the numerous and detailed questions concerning MRDS which we, albeit within certain temporal, financial, and organizational constraints, have attempted to answer.

Evaluation Overview: Empirical Strategy

In grappling with the research questions noted above, we opted to pursue a multi-methodological approach. While any given methodology has its strengths and limitations, we strongly adhere to the philosophy that an evaluation which asks core questions in several different ways and gathers data from a variety of sources will ultimately lead to conclusions which are

not 'method-bound' and, hence, more robust. Accordingly, we pursued several methodological approaches including (a) questionnaires; (b) structured and unstructured interviews; (c) behavioural observation of the system in use; and (d) archival analysis of VPD data. The procedures associated with each of these is described in detail below.

III. Methods and Data Sources

The Questionnaire

Guided by our research objectives noted earlier, a questionnaire was constructed by the principal investigator. This was subsequently redrafted following the solicitation of input from the co-investigators, research assistants, and Superintendent Cocke of VPD. The final version of the questionnaire appears in Appendix A. A primary advantage of utilizing the questionnaire in this context was that it allowed us to systematically obtain a broad sample of opinion from users of the system. Its structure ensured that the data could be easily coded for computer analysis.

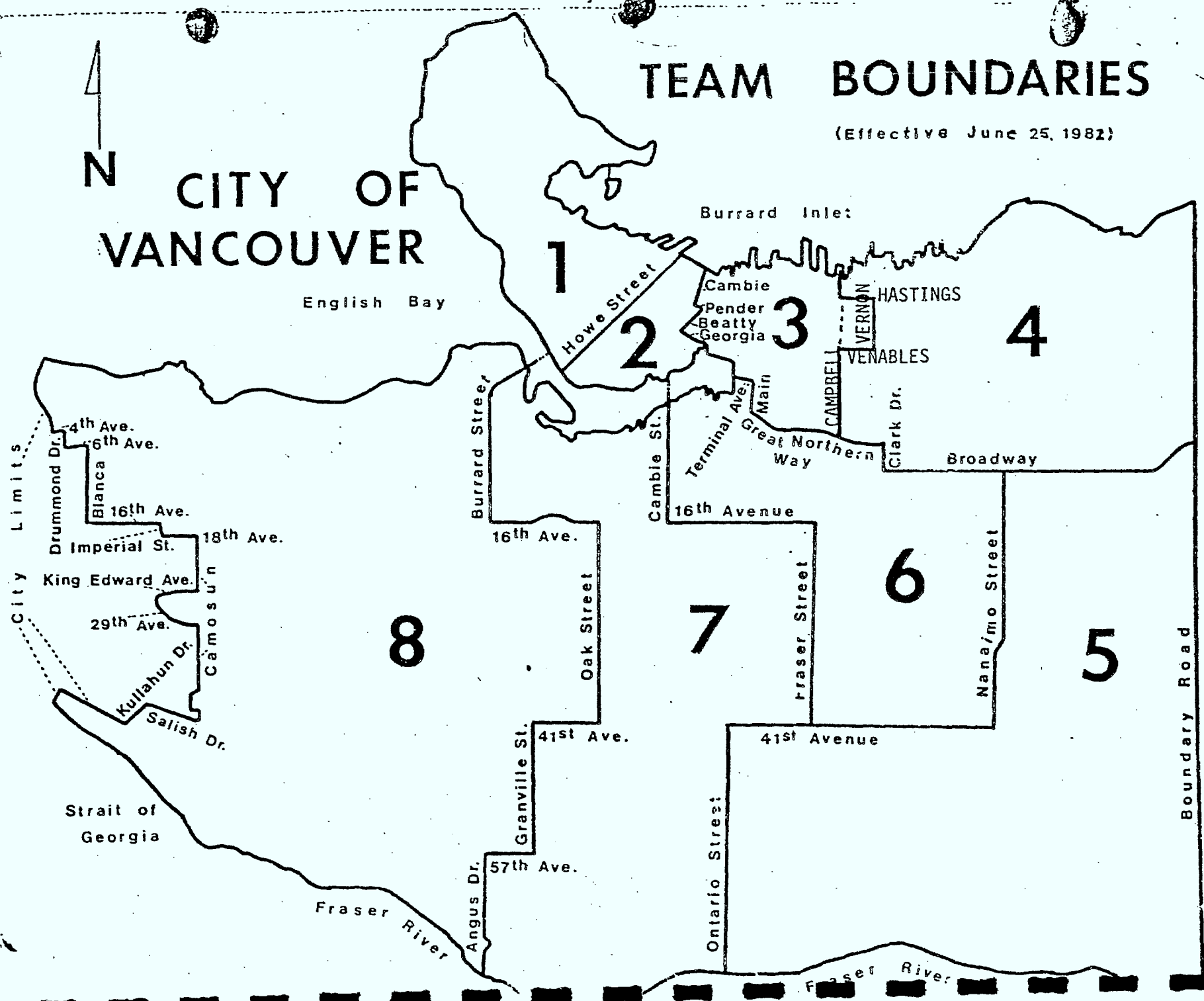
The Vancouver Police Department Patrol Division is organized on a team policing basis, with the city having been subdivided into eight different team zones as shown in the map on the following page. Within each team are three main shifts and two supplementary ones. Officers rotate shifts approximately once a month, but never change teams unless formally reassigned. The eight teams are divided into 'Patrol North' (Teams 1 through



CITY OF VANCOUVER

TEAM BOUNDARIES

(Effective June 25, 1982)



4), which operates out of the main station downtown, and 'Patrol South' (Teams 5 through 8), which operates out of a separate location in the southern part of the city.

With the cooperation of Superintendent Cocke of VPD, 300 copies of the questionnaire were delivered to his office for further distribution to all eight teams. Half of these went to the superintendents of Patrols North and South, whose aides (both Corporals) distributed them to the various teams. A total of 205 completed questionnaires were returned to us.¹ Table 1 shows the number and proportion of officers by team zone who filled out the questionnaire. As may be seen, our sample represented a 68.3% return rate of all questionnaires distributed, or 40% of all VPD Team members.

Respondents were asked to supply several pieces of information about themselves. Of the 201 respondents who indicated their current rank, 190 (or 95%) were police constables, while a further 6 and 5 (or 3% and 2%) held the rank of corporal or sergeant, respectively. This compared favourably with the actual team rank structure within VPD. Of the 513 team members, 458 (or 89.3%) are police constables, while 23 and 24

¹ It should be noted that there were great time pressures associated with the distribution and collection of the questionnaires. We wish to thank Superintendent Cocke, the Patrol Division Superintendents, and the two aides for their diligence and conscientiousness in ensuring that an adequate sample was obtained.

Table 1

Questionnaire Response Rates by Team			
Team	N of Officers in Team	N of Officers Responding	Response Rate
1	78	34	43.6%
2	55	21	38.2%
3	58	32	55.2%
4	57	18	31.6%

Patrol			
North	248	105	42.3%
Total			

5	63	28	44.4%
6	70	27	38.6%
7	66	26	39.4%
8	66	14	21.2%

Patrol			
South	265	95	35.9%
Total			

VPD Total	513	205*	40.0%

*This total includes five officers who did not note their team zone on the questionnaire.

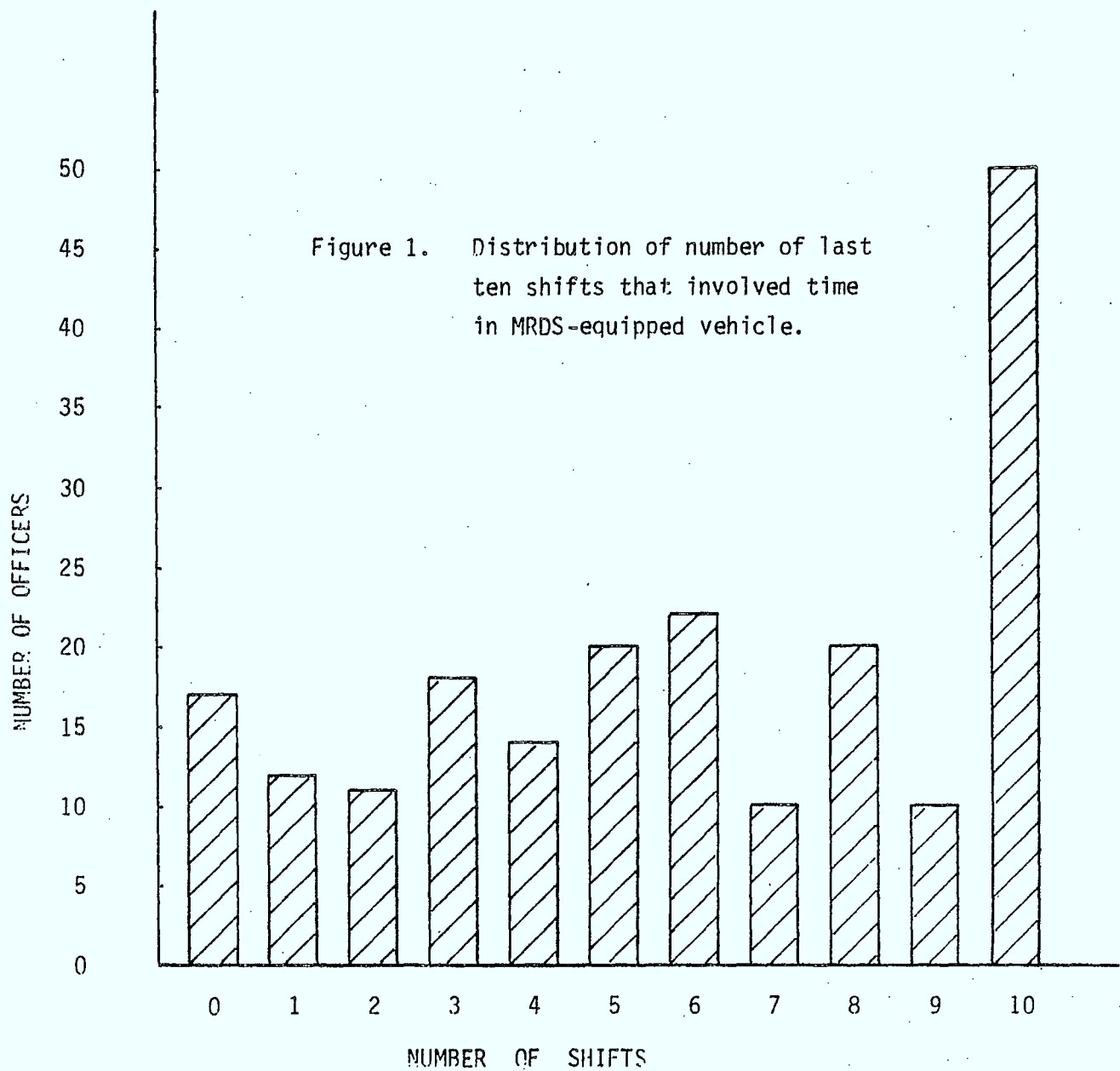
(or 4.5% and 4.7%) are corporals or sergeants, respectively. The remaining 8 (or 1.6%) VPD Team members sampled equally comprised staff sergeants and inspectors; none of these persons filled out a questionnaire.

On other 'demographic' attributes, we do not have the overall VPD data to assess the comparability of our obtained

sample with VPD as a whole. Nonetheless, respondents' answers to these questions are useful in describing the sample. For example, our respondents varied considerably in their policing experience, with the sample including everyone from rookies (minimum experience was less than one year) to veterans (maximum experience was 21 years). In terms of central tendency, both the mean and median number of years of policing experience at VPD was 7.9 years.

With respect to MRDS, 151 (or 75%) of the respondents indicated that all cars were voice-only when they joined VPD, while the remaining 25% indicated that MRDS had already been implemented when they joined. One hundred sixty-three (or 81%) of the respondents indicated that they had been trained to use MRDS while a further 18% had not received formal training. Finally, respondents were asked to indicate how many of their last 10 shifts involved time spent in MRDS-equipped cars. Their distribution of responses is shown in Figure 1.

In sum, we were able to obtain a fairly substantial sample of VPD team members to fill out the questionnaire. While by far the largest proportion of the respondents were police constables, this was quite close to being proportionately representative of that rank within VPD. On other variables such as policing experience at VPD, training on MRDS, and recent experience with the system, our sample was quite varied, ie., we



were pleased to acquire a good, heterogeneous sample of officers. Their opinions regarding MRDS will be discussed at a later point in this report.

Interviews

While the questionnaire had the great advantage of allowing us to sample a broad array of opinion from officers at VPD, this strength was not acquired without cost. It was not possible for us to ascertain, within the context of the questionnaire, what rationale or reasons lay behind the ratings the officers gave. For example, the questionnaire would allow us to ascertain the distribution of responses to the statement that "I think that MRDS makes policing a lot safer". But while that in itself was important to know, we would not be able to determine from their questionnaire responses why or how officers felt MRDS made policing more or less safe.² This deficiency was alleviated by supplementing our questionnaire data with interviews of certain officers at VPD.

² Of course, one could always ask officers to explain each rating within the context of the questionnaire, but this would have made the instrument much more cumbersome. This in turn would have required that we reduce the number of questions asked and/or would have led to a probable reduction in sample size, neither of which we were prepared to entertain.

An interview schedule was constructed which addressed themes which overlapped with the questionnaire. A copy of the interview guide may be seen in Appendix B. As implied above, our intention was to use interview responses as a supplement to questionnaire data. Our interview sample included all officers who participated in the observational portion of the study (described below). Research assistants were instructed not to administer the interview at such a time or in such a way that it would affect the behaviour being observed. Rather they were to treat the interview guide as a checklist of questions that could be posed as opportunities arose, eg., during coffee breaks and any other periods when observational data were not being collected. The assistants were given the option of either formally asking questions and writing down response summaries at the time, or merely asking questions in informal conversational style and then writing response summaries at the end of the shift.

As the description above suggests, our intent with the interview material was not ultimately to be able to make statements to the effect that "47% of officers interviewed indicated that ...". Rather, we wanted to obtain verbal reports that would help us interpret the questionnaire data. Toward this end, one of the field coordinators gathered the interview material from the research assistants, and summarized themes which emerged from the interviews, by category. It should be

noted that while some officers who completed questionnaires also happen to have been observed (and hence interviewed), it would be inappropriate, technically, to assume that questionnaire responses were fully explained by the interview responses. Rather, while the questionnaire responses indicated the opinions of a broad sample of VPD officers, the interview material only (but importantly) indicated why some officers might feel one way or the other.

In-Car Observation

The questionnaire and interview data noted above were seen as important sources of information regarding attitudes and reported usage. But we also wanted to ensure that we looked at actual as well as reported usage. In order to determine how police officers actually utilized the MRD System, observers were placed in routine Vancouver Police Department patrols as "ridealongs." These observers classified MRDS transactions with respect to their content, such as type and outcome, the circumstances surrounding the transaction and the transaction outcome. MRDS transactions were measured with respect to time lapsed in encoding and response latency, ie., the time taken to key in and transmit messages, and the delay before a response was received. The number of transactions per hour was also noted. A copy of the observational protocol and brief coding

'manual' may be seen in Appendix C.

In addition to these more objective quantitative data, observers were asked to make judgements about the constables using the MRD System, so as to assess whether variation in use was systematically related to a particular officer type. The following sections detail the sampling procedure and data collection methods and instruments described above.

Sampling Procedure

As noted earlier, the patrol responsibilities of the Vancouver Police Department are shared by eight "teams", organized by geographic zone. Within teams, constables are in one of three squads, with each squad generally responsible for one of the three primary shifts. These are Alpha Shift (0700 to 1700 hours), Bravo Shift (1600 to 2600) and Echo Shift (2100 to 0700 hours). Two additional duties (Charlie and Delta Shifts) are also used where appropriate to augment patrol coverage. As each shift is ten hours long, patrol officers are on duty four days per week, and thus have three days weekly leave. Shifts are rotated approximately once a month so that officers on duty for Alpha Shift in a given month will be responsible for Echo shift the next month, and so on.

But while the preceding paragraph outlines the 'theoretical' shift structure of police patrols, the actual allocation of constables to patrols varies according to need. More patrols are present in the evening than in the morning, for example, and more patrols are scheduled for Fridays and Saturdays than weekdays. Although most patrols involve two-person units, one-person patrols are more common in the morning and on weekdays. Additionally, officers can be on special assignment, can have court duty or plain clothes or unmarked car (and therefore non-MRDS) duty, can be in training or on special, sick or annual leave. It was within these constraints that the sampling procedure had the following objectives:

1. even sampling across zones and squads;
2. three observation periods per police officer, observed at least once before and once after the monthly shift rotation; and
3. observation of a given police officer by the same observer for all periods.

We intended initially to sample only from Teams One, Two, Five and Six. These corresponded to the teams who used the radio channels studied in the Cantel (1982) engineering evaluation of MRDS: channel One (Teams One and Two) and channel Three (Teams Five and Six). However, in order to contrast the potentially divergent uses of the MRD System across the city, Teams Seven

and Eight (Radio channel four) were added to the sample. The size of the sample from Teams Five through Eight was, however, about equal to that from Teams One and Two alone, the total sample size being limited by the temporal and financial constraints of the study. Given that our main contextual comparison of interest was between the more commercial and highly urban West End and Downtown areas versus the other, more residential, areas, concatenating Teams Five through Eight was considered justified. Teams Three and Four, not sampled as part of the in-car observations, were used in the training of observers and pretesting of collection instruments.

Sampling Across Zones and Squads

In total 88 ridealongs took place. Twenty-six were in Team One, 18 in Team Two, 12 in Team Five, 11 in Team Six, 12 in Team Seven, and 9 in Team Eight. Twenty-four of the ridealongs were on Alpha shift, 35 on Bravo shift, and 29 on Echo shift. Thirty-two of the ridealongs involved one-man cars while 56 involved two-man cars.

Observations Per Officer

A grand total of 82 different officers participated in the in-car observation of the MRD System. Of these, two were observed on four occasions, 14 were observed on three occasions, 22 on two, and 44 on only one occasion. Of the 38 officers observed on multiple occasions, 29 were observed before and after the shift rotation. The remainder were observed only before or after the rotation. Of those observed on multiple occasions only 20.3% were observed by more than one observer.

Data Collection Instruments

In-Car Observational Coding Form. For pragmatic reasons, in-car observation periods commenced at the beginning of the shift for which a ridealong was scheduled, that is, at 0700, 1600, or 2100 hours. Each was about four hours long. During this time, observers coded each radio and MRDS transaction that took place.³ The observation form is shown in Appendix C. Items coded were:

³ -----
It should be noted that both MRDS and the voice communication medium actually utilize the radio system, but for the sake of convenience and parsimony with VPD's use of the terms, we will always refer to MRDS as MRDS, while voice communication will be referred to as radio or voice.

1. date and day of week;
2. duty description; this was a four-character designation denoting first the team number, then the shift name (A for Alpha, etc.), and finally the particular car number (e.g., 1A12 refers to Team 1, Alpha Shift, Car Number 12);
3. the observer;
4. a start and end time for a transaction or series of transactions. This allowed for breaks in the observational period and permitted calculation of the number of transactions per hour;
5. the time from the beginning of message encoding to the completion of the transmission of the message ("period 1"). For MRDS transmissions this was the time it took for an officer to type in information necessary for a query up until the transmission key was depressed. For radio transactions it was the time it took for an officer to complete his or her spoken message, including the time from a request for the attention of the dispatcher and dispatcher acknowledgment to the beginning of the message;⁴
6. The time it took from the beginning of message encoding (the

⁴ -----
Good radio discipline, as practised by the V.P.D., includes the requirement that the unit on patrol or the dispatcher request the attention of the dispatcher or unit by announcing the duty name (e.g., "1A12"). When the party being called is free to respond they do so by repeating the duty name, after which the message begins. Period one can be conceptualized as the encoding latency for any message, that is, the time for a message to be formulated (typed or voiced) and sent. It thus includes any delays due to formulation (typing or voicing) and to sending (transmission failure or delays in receiving acknowledgment).

onset of period one) to the beginning of a response (period two). For voice messages this was the time until the dispatcher or other unit began the response, including the request for the attention of the unit or dispatcher. MRDS responses are announced by an audible tone; this ended period two;⁵

7. The origin and destination of a message was recorded (alternatives included the ridealong unit, dispatch, some other unit, or all other units);
8. It was recorded whether the MRD system or the radio was the medium used to transmit the message;
9. Each message was coded as to type - whether it provided information or requested it. MRDS queries were considered inquiries; narratives could be inquiries or information;
10. The content of the message, according to the eight MRDS "forms", was coded for both MRDS and radio transactions. These eight forms are: vehicle queries, person queries, property queries, licence plate queries, drivers licence queries, status message, narratives, and sign on messages;
11. The content of the response was categorized as follows: no response; system busy; error in transmission; successful response or a "hit", where the query resulted in information about active criminal activity (e.g., stolen vehicle or

⁵ Period two can be conceptualized as the time it took until a response was received, or response latency. Note that it does not take into account the length of time necessary for a response to be provided because of the difficulty in reconciling alphanumeric, displayed responses with aural responses.

active charges); and a successful response but where no criminal activity was indicated (e.g., vehicle not in stolen file);

12. The consequence of the transaction was coded as to whether some action resulted and of what type. The categories used were: no action; information provided to individual; warning given by police; vehicle or person stopped; arrest made; vehicle or property impounded; resources (e.g., other units, tow truck, ambulance) mobilized; pursuit; surveillance; police report completed; and ticket given;
13. Whether the consequence was the result of information provided by the MRD system or radio as opposed to the information being incidental or supplementary to the type of action taken; and
14. Whether the MRDS or radio transaction was initiated because of a dispatch order, officer suspicion or observation, or was initiated by the officer without apparent external cause.

Discussion: Sampling

Given the complexity of the scheduling system of the Vancouver Police Department, and the dictum that whatever can go wrong will, we felt that our sampling objectives were met

extraordinarily well.⁶ Our selection of officers within shifts could be considered haphazard rather than random. There was no visible effort on the part of the Vancouver Police Department to determine who was scheduled for a certain time. For the most part a set of shift dates and times and officers was suggested and, within the constraints of the scheduling system, was accepted. Patrol officers, however, have varying attitudes toward the notion of having someone ride along during active duty. The presence of a "civilian" may affect dispatches and responses because of concerns about safety, as well as possibly affecting an officer's social behaviour while on duty. The scheduling of the same observer with officers over repeated observations was an attempt to reduce this influence by promoting familiarity, and, indeed, there was every indication that this goal was achieved.⁷ Nevertheless, officers could withhold their participation by taking sick or other unscheduled leave, by failing to pick up the observer, or by refusing to interact with either the observer or the MRD System during the ridealong. Such occasions were rare, but they suggest that some self-selection occurred.

⁶ -----
This was due in no small part to the efforts of the Aides to the Superintendents with whom we dealt.

⁷ We wish to laud our research assistants here, for it was clear that their sincere interest in the study and policing per se helped establish rapport. It may also be noted that most, but not all of our observers had had policing or police-related experience prior to the current study.

Discussion: Observational Coding

It was hoped that repeating the same observer/officer combinations would increase familiarity and thus reduce any tendency for officers to behave in any way other than their usual manner. Nevertheless, the presence of an observer may have had the effect of promoting MRDS use, or of discouraging it, depending on the officer's (dis)comfort with the system, and attitudes regarding the research.

Categorizing MRDS transactions, was, for the most part, straight forward, since the nature of the system lent itself to clear cut categorization (ie., by form). Radio messages were more difficult to categorize, since they often involved multiple transmissions and were interspersed with messages to other patrol units. Observers were faced with the task of timing the encoding and response latency of messages while simultaneously categorizing content and circumstances. Pretesting revealed that very short transactions were easily missed, and inter-rater reliability was low for periods of less than 5 or 10 seconds. Timing was therefore revised so that periods that were essentially instantaneous (under about 5 seconds) that could not be timed successfully were coded as "Instantaneous" (and assigned a value of 1 second), those under 10 seconds were coded

as "short" (and assigned a value of 5 seconds), and those over 10 were timed to the nearest second (and coded as such). Nonetheless, we still do not feel completely comfortable with the accuracy of our latency data, and, since they are not integral to the questions we have addressed, have chosen to minimize their importance in this report.

Archival Data Sources

All MRDS transmissions are recorded, but in digital form on magnetic tape. The entire content of each query and response is recorded, thus raising the possibility of archival, out-of-car analysis. The sheer volume of information, however, makes this prohibitive.⁸ Each transmission begins with a "header" of identifying information, followed by up to six pages of information. An average daily volume of about 3600 transmissions could thus result in approximately 20,000 pages of information. However, analysis of the header information is manageable. A program to provide basic classification of MRDS messages by form and time has been written for the Vancouver Police Department. This was applied to a sample week of MRDS activity. In order to

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This is true, of course, given current software. The development of this capacity would help bring to fruition MRDS's potential as both a management information system and as a means for enhancing accountability regarding system use. At present, MRDS is perceived as an isolated piece of police technology.

allow calculation of rate information, arrangements were made with VPD for dispatchers to keep track of the number of units signed on to the MRD System for each hour of the week sampled. This allowed us to compare the data from our ridealong observations of MRDS usage to the overall usage pattern within a given week, and, indeed, led us to conclude that our observations were, proportionately, quite representative except for an underrepresentation of 'narratives' and an overrepresentation of vehicle plate queries.

Actual radio channel use in seconds per hour was also available for the week sampled. This facilitated comparison of MRDS and radio channel usage for identical periods.

Data Sources: Final Remarks

In sum, a diverse array of data sources and methods were employed in addressing our research questions. We will now turn to some of the answers we unearthed, organized by the research questions which guided our evaluation.

IV. Attitudes Regarding MRDS

Overall Evaluation of the System

Officers' attitudes regarding MRDS were addressed most directly by means of the questionnaire and interview schedules. Two questionnaire items asked respondents to make an overall evaluation. The first was an open-ended question which stated "Now that you've had a chance to use MRDS, how, in general do you feel about the system?" Responses were coded as positive, negative, or neutral depending on whether their comments were solely positive or supportive, solely critical, or neither critical nor supportive. In total, 92% of the officers who responded did so positively, 4% gave comments which were coded as neutral, and the remaining 4% were negative.

The second item which asked for an overall evaluation of MRDS was the last question in the questionnaire. It requested that officers indicate the extent of their agreement or disagreement with the statement that "Overall, I like MRDS". As occurred with the open-ended item, officers' responses were extremely positive. A full 66% of respondents agreed with the statement, while a further 27% agreed 'somewhat', ie., 93% of

respondents agreed to some extent that they liked the system. A further 6% felt neutral about MRDS, while 2 respondents (1% of the total) indicated some disagreement with the statement. In sum, officers who completed the questionnaire were highly positive about the system. But why?

System Strengths

A partial answer to this question is revealed by correlating responses to the "Overall, I like MRDS" item with the responses to other items in the questionnaire. Table 2 lists items which correlated significantly with the overall evaluation. In viewing the table, the reader should note two things. First, items which are positively correlated with the liking item imply that agreement with the items is associated with greater liking, while items which are negatively correlated imply that disagreement with the item is correlated with greater liking. Secondly, the reader should note that while all reported correlations are statistically significant at the .01 level or beyond, many are not all that large. With respect to the latter point, the reader is reminded that when variability is low, eg., as in the "liking" item which was so highly skewed, correlations are bound to be suppressed (eg., see McCall, 1980).

Table 2

Items Correlating Significantly With The
Evaluative Item, "Overall, I Like MRDS"

Item (Agreement = Liking)	Correlation
I think MRDS makes policing a lot safer.	+.34
I find that with MRDS, I end up relying on the system more and more.	+.24
I think MRDS helps me be a more effective officer.	+.33
MRDS has had a positive effect on my job satisfaction.	+.41
I find I check out a lot more people on CPIC now than I did before MRDS.	+.44
I find I check out a lot more cars/licences with MRDS than I did before.	+.22
The more information we have about the people we deal with, the better.	+.30
It would be desirable to have even more information on MRDS than we have now.	+.37
MRDS makes me more independent of the dispatcher.	+.22
With MRDS, I probably investigate cars or people I otherwise wouldn't have bothered with.	+.22
With MRDS, I get information much more quickly than with radio only.	+.26

Table 2
(Continued)

Items Correlating Significantly with
Evaluative Item, "Overall, I like MRDS"

Item (Disagreement = Liking)	Correlation
MRDS is a nice toy, but it hasn't affected policing at all.	-.36
Given a choice between using the radio or MRDS to get information, I'd rather use the radio.	-.21
Ultimately, I think MRDS dehumanizes policing	-.30
MRDS produces so much information it makes me a less effective officer.	-.30
I would rather work in a radio-only car.	-.40
I feel tied to my car with MRDS.	-.19
MRDS can create a false sense of security with suspects.	-.19

A perusal of the items in Table 2 leads to a number of conclusions regarding concomitants of liking for the system. In general, those who expressed strongest liking for the system seemed to like it because it gave them quicker access to a lot more information, which they felt made them more effective and their job safer. Overall, they expressed increased job satisfaction due to the presence of the system.

The question of job satisfaction was an interesting one which deserves further comment. In response to the item "MRDS has had a positive effect on my job satisfaction", 15% of officers indicated strong agreement, 43% agreed 'somewhat', 35% felt neutral or undecided, while 3% and 4% disagreed strongly or somewhat, respectively. In general, then, a majority of officers expressed some increase in job satisfaction due to MRDS. Certainly part of this is attributable to the feelings of efficacy and safety that went along with liking for the system. But, in addition, our interviews with officers revealed that some portion of this increment in job satisfaction came from the greater autonomy they felt with MRDS.

To fully appreciate this one must consider the pre-MRDS situation. Whenever one required information, one had to make the request through the dispatcher. A constant stream of requests to the dispatcher, particularly during busy times, often led to the dispatcher feeling harried. When this occurred, dispatchers would apparently indicate their displeasure by tone of voice, direct reprimand, or by giving the unit 'undesirable' calls such as sudden deaths. In sum, units were expected to be selective in their requests and one knew when the "bounds of tolerance" were crossed, since dispatchers could make their displeasure known by the way they dispatched and treated requests for information. At the same time, the "public" aspects of radio also ensured that other officers in other patrol units

were able to monitor what and how much one was doing. As is true of many other occupations where productivity is easily monitored, police constables seem to have developed informal social norms regarding 'appropriate' levels of activity. Officers who didn't pull their share of the load or who were too "gung ho" would receive informal cues to let them know that they were deviating too significantly from the rest of the group. But with MRDS, one does not have to impose upon dispatchers for information, nor are other officers able to monitor one's activity. Consequently, officers seem better able to establish their own level of activity, and increased job satisfaction appears to have been the result.

The questionnaire contained many items which were generated by our speculations of attributes of the system that officers would find appealing. But, in addition, we also asked some open-ended questions of officers. For example, immediately following the open-ended question where officers were asked to express an overall evaluation of the system, we went on to ask, "More specifically, what do you see as the strongest advantages to having MRDS?" Responses to this question were coded in two ways.¹ First, we coded whether the advantage being noted could best be considered an attribute of the system per se, or an implication of the system for some other system or for some

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We wish to thank Gloria Baker-Brown for developing the coding schemes for these open-ended data, and for coding questionnaires.

other aspect of policing. Of the 201 officers who responded to this question, 34 (or 17%) noted attributes of the system per se, while the remaining 167 (or 83%) focussed on implications of the system. We will discuss the "attribute" responses here, while the "implications" responses will be dealt with in a later section of this report.

Within the "attribute" responses, we further subdivided our coding scheme depending on whether the attribute the officer mentioned pertained more to the system hardware or software. Of the 34 officers who gave "attribute" responses, 28 commented positively on system hardware. In particular, 27 persons indicated they appreciated the speed of response to queries that MRDS allowed, while one individual noted that, because information appeared on and stayed on the CRT screen, one didn't have to worry about hearing the dispatcher accurately or forgetting some point of information. In addition, officers appreciated that they could now scan the information available for important points, instead of relying on the dispatcher's synopsis. In sum, they appreciated that the locus of decision-making was moving more toward them. While this point was made by only a single individual in response to this question, it would be a mistake to consider it trivial, since it appeared more frequently at other points in the questionnaire and in our interviews with officers. Its lack of appearance here is probably more a reflection of its lack of saliency rather

than of a lack of appreciation for that attribute.

Up to this point we have seen that officers, overall, expressed enthusiasm for MRDS in their questionnaires. Yet it would be inappropriate to conclude that they had no complaints or saw no room for improvement. Similarly, while they expressed very positive attitudes regarding MRDS per se, it would be erroneous to conclude that, given a choice relative to some other mode of communication, all or most officers would necessarily choose MRDS.

Some Limitations to MRDS

Immediately following the "advantages" question noted above, we asked respondents "What limitations or shortcomings do you see in MRDS?" Of the 196 persons who responded to this question, 19 (or 10% of the respondents) stated that MRDS had no limitations or shortcomings at all. A further 157 (or 80%) specified limitations which we coded as "attributes" of the system per se, while the remaining 20 (or 10%) focussed on "implications" of the system. "Attribute" shortcomings were secondarily coded as primarily hardware or software related. Within each category, one attribute seemed more salient than all others.

Hardware. Of the 157 persons who focussed on attributes of the system in their identification of shortcomings, 85 (or 44%) gave responses which we coded as "hardware" related. Of these, by far the largest group noted that the system had too much down-time. This was noted by 63 different persons (ie. , 74% of those noting hardware attributes of the system, or 32% of all those who responded to the question).

Given the apparent saliency of this deficiency, further comment is required. Two main points deserve note. First, all of our research assistants noted comments of this sort in our project team meetings and in their written reports. But they went on to note that officers typically did not differentiate between MRDS down time per se as opposed to CPIC down time or problems with the availability of other information bases. All they knew was that the information was unavailable to them, and their tendency was to attribute blame to the system in front of them, ie., MRDS. But, as a second point, it does merit mention that MRDS itself does indeed experience occasional down time for one reason or another. When this occurs, the speed of recovery is directly proportional to the availability of Francis, VPD's one and only computer aficionado. This individual is extremely competent in dealing with both hardware and software problems, but is, unfortunately, the only person who can "fix" the system when it crashes. Consequently, recovery is quick when Francis happens to be on duty, but quite slow and frustrating to

officers when he is off duty and/or otherwise unavailable.

Other than the "system down" complaint, officers' hardware concerns were spread over five other attributes. Nine persons disliked that one had to type queries into the system and, indeed, at least two of our research assistants commented that they felt typing ability was one of the key predictors of comfort with and use of the system. A further 5 respondents felt the MRDS console occupied too much space in the vehicle. Unfortunately, it is not clear from the questionnaires whether these persons were referring to all VPD vehicles or a subset thereof. Our research assistants observed that while space complaints were virtually non-existent in VPD's larger vehicles, which make up most of the fleet, there were many complaints about lack of room in the smaller cars, particularly the Volvo. Finally, 4 respondents indicated that the keyboard lighting was inadequate at night, 3 felt that information response time was too slow, and 1 respondent reported problems with keys sticking.

Software. As with hardware attributes, one software shortcoming was noted far more frequently than all others. Of the 71 persons whose responses focussed on software attributes, 57 (or 80%) of responses lamented the lack of access to Criminal Name Index (CNI) files. Unlike the CPIC person files which give current wants, warrants, and the names of probationers and parolees, the CNI files give full criminal history information.

The information is available to officers now, but they must formally request it and receive it by a secure land line (e.g., telephone), MRDS narrative, or actually come into the station to obtain a hard copy printout. In our interviews with officers, they justified the prospect of having on-line access to CNI via MRDS as all a part of knowing with whom one is dealing. One of the questionnaire items asked officers to indicate the extent of their disagreement or agreement with the statement that "The more information we have about the people we deal with, the better". Of the 204 officers who responded, 158 (or 77%) agreed strongly, 42 (or 21%) agreed somewhat, 3 persons were neutral or undecided, and only 1 person disagreed strongly. The request for direct access to CNI information seems a continuation of this rationale.

It may be noted that both within VPD and at CPIC, the question of broader access to CNI information is a contentious issue. There are currently only 11 non-RCMP terminals in Canada that can access CNI information, and VPD has one of these. At the moment, broader access to CNI via MRDS terminals would require VPD to petition CPIC to allow this capability. But VPD is still examining their policy in this area, and is not yet prepared to formalize a request. On the other hand, Superintendent Cocke of VPD indicated that CPIC is now independently examining their own policy in this area. Specifically, they are apparently considering giving CNI access

to all authorized CPIC terminals. This would, of course, include the MRDS terminals if VPD chose to take advantage of that capability and programme it in to MRDS. In any event, it seems this would not occur until 1985 at the earliest.

In the literature we reviewed regarding systems similar to MRDS, only McKim's (1979) article on Detroit's Mobile Digital Terminal (MDT) system directly addressed the issues regarding access to criminal history information. He stated that "The fact that MDT units are considerably more vulnerable and subject to misuse than law enforcement computer terminals housed in police agencies confirmed the need to prohibit criminal history information from being accessed by MDT units" (p.26). We are not aware of how other departments have resolved or whether they have even addressed this question.

Beyond the complaint that CNI information was unavailable to them, only four other software shortcomings were noted by our questionnaire respondents. Ten persons indicated that they desired access to more information than was currently available, and our interview data lead us to suspect that these were primarily more requests for CNI access, couched in more general terms. On the other hand, it was not infrequently that our assistants came across suggestions that MRDS terminals should have more extensive graphic capabilities so that one could have access to maps, and to transmit photographs or composite

sketches of suspects. Beyond this, two respondents noted that cross-checked information was not always consistent, one person indicated he/she had found that some vehicles were not listed on the system, and a final respondent indicated he/she had difficulties accessing information on occasion, although it was not clear what these occasions were.

If we were to speculate on what this last respondent was referring to, our interview data and access statistics (described later) suggest that it would be to the 'property' query. Unlike most MRDS "forms" which are, for the most part, quite self-explanatory, the property form requires that officers know the codes associated with different types of property. Many do not know them, or are unsure of them, such that access is difficult and frustrating. Consequently, this form is little used.

Comparing MRDS and Voice: Preference. As was discussed earlier, the overall evaluations of MRDS by officers were extremely positive. It would be erroneous to conclude on the basis of that absolute statement, however, that officers necessarily preferred MRDS to their other primary communicative device, i.e., voice. The relative merits of MRDS and voice were addressed in two sections of the questionnaire. First, there were some attitude items which made implicit or explicit comparisons. Second, officers were asked at one point to

identify situations in which voice and MRDS were more frequently used. The latter item will be explored more fully in the next section which deals with situational determinants of MRDS and voice channel utilization. The former will be discussed now.

One item from the questionnaire was of particular interest to us. Respondents were asked to indicate the extent to which they agreed or disagreed with the statement that "Given a choice between using the radio or MRDS to get information, I'd rather use the radio". While 104 (or 52%) of the respondents disagreed with that statement (32 'strongly' and 72 'somewhat' so), we found it interesting that 60 individuals (or 29%) agreed with the statement, while a further 36 were neutral or undecided. We were curious how perceptions of other aspects of the system varied with officers' positions on this item, and hence computed correlations between this and the other attitude items. The items which correlated significantly are displayed in Table 3. Note that a positive correlation implies that greater agreement with the item was associated with a preference for radio (and greater disagreement with a preference for MRDS), while a negative correlation implies that disagreement was associated with a preference for radio (and greater agreement with a preference for MRDS).

In perusing the items which correlated significantly with preference for radio, two comments are worth noting. First, the

Table 3

Attitude Items Correlating Significantly
With a Preference for Radio Over MRDS

Item (Agreement = Pref. for Radio)	Correlation
MRDS produces so much information it makes me a less effective officer.	+.19
The information available by MRDS is quite adequate as it stands now.	+.16
I would rather work in a radio only car.	+.35
I feel tied to my car with MRDS.	+.24
MRDS can create a false sense of security with suspects.	+.19
MRDS is of less use in highly stressful situations.	+.21
MRDS is of less use when I'm on patrol by myself than when I have a partner.	+.16
Ultimately, I think MRDS dehumanizes policing.	+.19

Table 3
(Continued)

Attitude Items Correlating Significantly
With a Preference for Radio Over MRDS

Item (Disagreement = Pref. for Radio)	Corr.
I think MRDS makes policing a lot safer.	-.14
I find that with MRDS, I end up relying on the system more and more.	-.15
I think MRDS helps me be a more effective officer.	-.21
MRDS has had a positive effect on my job satisfaction.	-.20
I find I check out a lot more people on CPIC now than I did before MRDS.	-.24
The more information we have about people we deal with, the better.	-.17
It would be desirable to have even more information on MRDS than we have now.	-.22
With MRDS, I probably investigate cars or people I otherwise wouldn't have bothered with.	-.16
With MRDS, I get information much more quickly than with radio only.	-.28
Overall, I like MRDS.	-.21

reader should not conclude that the individuals on whom we are focussing here were negative about MRDS. Recall that the vast majority of VPD officers sampled were positive about the system, such that 'disagreement' with the item "Overall, I like MRDS"

actually implies qualified positivity more than negativity. And second, recall that most items had very skewed distributions such that it is not surprising that the correlations obtained were somewhat small.

Given these caveats, one can see how the pattern of items correlating with radio preference differed from the correlations observed with the overall "liking" item reported earlier. In general, two or three consistent themes emerged. First, those who reported a preference for radio tended to minimize the impact of MRDS on police safety and efficiency. Second, these individuals were less likely to report changes in their habits of querying persons and vehicles even though they now had more immediate access to the information. And finally, these persons did not subscribe as fervently to the notion that "more" is "better", and also seemed to be more willing to acknowledge occasional limitations to MRDS, particularly in stressful situations and when patrolling alone.

It was because of the interview data obtained by our research assistants that we were able to interpret this cluster of themes more fully. It would seem that a somewhat contentious issue among police constables at VPD concerns the way MRDS should be treated. As we saw earlier, many officers are MRDS enthusiasts who use the system frequently and feel that, in doing so, they increase their own safety and efficiency. The

contrary view that we have seen emerge here, however, asserts that by employing the system to such a degree, one is losing some of the "essence" of policing. Many officers commented that they felt an important aspect of effective policing involved the development of an "intuitive" or "sixth" sense about people. It was in this sense that they felt MRDS dehumanized policing. One was now letting the system make the decisions, rather than developing the decision-making ability in oneself. These officers felt that situations one should recognize as suspicious or unsafe were now being ignored because the appropriate "hit" wasn't obtained via MRDS. Similarly, many of these officers decried what they viewed as a lessening of contact between officers and people on the street. Instead of cultivating information and contacts and dealing with individuals on a personal basis, they felt MRDS had created a type of buffer between officers and the community, and hence encouraged a gradual loss of what they viewed as important policing skills. And finally, several of these officers noted that they felt it simply was not right to run someone's name or plate number through the system merely because they were there and the information was readily available. It was tantamount to search without reasonable cause and thus a violation of privacy. We will discuss these issues further when we deal with the implications of MRDS use.

V. Actual Use of the System

Observation of User Behaviour

The ridealongs resulted in classification of 2018 communicative transactions, of which 1162 or 58% were MRDS messages and 856 or 42% were voice messages. Table 4 shows the distribution of MRDS and radio messages by form, ie., the number of narratives, person inquiries, and so forth, within each medium of communication. The ranking of form by frequency of access is, incidentally, consistent with the relative importance of forms reported by questionnaire respondents (to be reported below). The MRDS form most frequently accessed during observation was Form 4, vehicle plate queries (45.2% of MRDS messages), followed by Form 1, vehicle registration queries (20.5% of messages). Person queries were third in prevalence (15.2%), followed by narrative messages (10.6%). These four forms accounted for 91.5% of observed transactions and for 96.2% of the situations in which questionnaire respondents reported MRDS useful.

It is of note that person queries were reported by questionnaire respondents almost twice as frequently (31.6%) as

Table 4

MRDS vs Radio Use by Form:
Observational Data

Form	MRDS		Radio	
	No.	%	No.	%
1. Vehicle Registration	238	20.5	31	3.6
2. Person	177	15.2	137	16.1
3. Property	2	0.2	36	4.2
4. Vehicle Plates	525	45.2	41	4.8
5. Driver's License	25	2.2	3	0.4
6. Status	19	1.6	314	36.8
7. Narrative	123	10.6	185	21.7
8. Sign-On	51	4.4	22	2.6
9. None of the Above	2	0.2	84	9.8
Total	1162	100.0	853	100.0

their actual occurrence. While the frequency of situations mentioned is not a direct measure of frequency of access, this finding suggests that person queries are especially salient. This may be because while vehicle queries predominate, they are less important with respect to an officer's safety and hence his or her behaviour. Another interpretation is that the 'person' form may be more salient because of its greater 'payoffs', since our data indicated that 'person' queries were associated with

arrests more frequently than any other form.

The radio "forms" or message content categories most frequently accessed during observation were status (36.8% of radio messages), narratives (21.7%), person queries (16.1%) and vehicle plate queries (4.8%).¹ These percentages also reflect closely the distribution of situations noted by questionnaire respondents.

Again, the rankings of MRDS and radio use by category reflect their differential advantages and functions - MRDS is used primarily for information access while radio is used primarily for status and narrative messages.²

1 The content category "other" was used to classify 9.8% of radio transactions, representing transactions which did not fit forms 1 to 8. This suggests that there is much more variability in the content of radio messages (only 0.2% of MRDS transactions were coded "other"). Although this category occurs more frequently than vehicle queries it may have multiple meanings and thus has been omitted from the ranking above.

2 It would be easy to say that this is the case because of the system's design rather than the result of officers choosing to use the radio and MRDS system differentially. But there is a wealth of fundamental literature on interpersonal communication which makes a distinction between digital and analog communication. Information can be conveyed digitally by characters or words which are related to their meaning only by agreed upon definition. For example, the word "horse" does not convey any of its meaning to someone who does not know the definition of the word. Analog information, on the other hand, is related in some way to its meaning. An oriental character meaning "horse", for example, may be a graphic representation of a horse's appearance, understandable to anyone. In an analog computer the value of a number is represented by a quantity of electricity. A digital computer operates by coding values into on-off pulses which have no quantitative relationship to what they represent. The meaning of spoken words is a conversation's digital component. The tone, inflection, emphasis, etc. is its

Archival Data

Categorization of MRDS use can also be done for archival data derived from taped records of MRDS transactions. As discussed in the earlier section of this report on methods, this analysis was based on the "header" or labelling information associated with transmission, and which was run on our behalf by VPD. The categories derived from the header are:

1. Unit-to-Dispatch narratives;
2. CPIC Person queries;
3. CPIC Vehicle queries;
4. B.C. License Plate queries;
5. Driver's License queries;
6. Unit-to-Unit Narratives;
7. CPIC Responses; and

²(cont'd) analog component. The implication of this for MRDS and radio usage is that while digital communication is most efficient and useful for conveying content and meaning, analog information is best at conveying the relationship between the participants in the transaction. Digital MRDS information is best at conveying facts, such as words and figures. Analog radio information is able to convey information about which participant is in authority, what the arousal level of the participants is, and emotive tone. A status message conveyed over radio is more easily understood because a listener can attend to how it is said. An MRDS status message provides none of this relational information.

8. Insurance Company of B.C. (ICBC) and B.C. Motor Vehicle Branch Responses.

The analysis is performed by reading the header information, adding the category information to a running total, proceeding to the next header, and so on. Because part of the header information is the date and time of the transmission, the totals for each category can be produced on an hourly breakdown.

Table 5 shows the distribution of MRDS use by category, as derived from archival data for the week of 2 March 1983 to 9 March 1983 (seven days beginning and ending at 0900). The bulk of queries, as revealed by the observational results, were vehicle queries. Narratives ranked second in proportion of queries, while person queries ranked third. Of a total of 25,085 transmissions, 4,659 (or 18.6%) were narratives, 10,380 (or 41.4%) were queries, and 10,046 (or 40.0%) were responses. The ratio of queries to responses shows that 96.8% of queries received responses. The remainder were queries not answered because of errors, transmission problems, and so forth.

The archival and observational data can be compared for those categories that are common. Table 6 shows the percentage of transactions for comparable categories. Although the ranking of categories within data sources is quite comparable, some differences are apparent. The observational data show

Table 5

MRDS Use By Category:
Archival Data -- Weekly Total

Category	No.	%
1. Unit to Dispatch Narratives	1846	7.4
2. CPIC Person Queries	1944	7.7
3. CPIC Vehicle Queries	5956	23.7
4. B.C. Plate Queries	1763	7.0
5. Driver's License Queries	717	2.8
6. Unit to Unit Narratives	2813	11.2
7. CPIC Responses	7885	31.4
8. B.C. Responses	2161	8.6
Total	25085	

Table 6

MRDS Use: Archival vs Observational Data

	Archival	Obs'vat'l
Narratives	30.9%	20.7%
Person Queries	12.9%	21.1%
Vehicle Queries	39.6%	38.1%
Registration Queries	11.7%	18.1%
Driver's License Information	4.8%	1.9%

proportionately fewer narratives, more person queries, and more vehicle registration queries. There are several possible reasons for this, including differences in days sampled, differences in hours sampled, and the reactive effects of being observed. The proportion of narratives may be smaller for the observational data because of the inhibiting effect of a strange observer on a form otherwise frequently used for private, informal communication between cars.³ At the same time, observers frequently were left with the impression that officers were "showing off" during their initial contacts with ridealongs, and, if this was the case, would in all probability use the "easier" forms to do so.⁴

When comparing the archival and observational data on volume of transactions, one must realize that within the archival data, queries and responses were counted separately, as is obvious from the categories, but that the observational data

³ In fact, at least two different sources commented to us that constables had been told about the study at morning "parade", and that it was indicated that they should reduce their frivolous use of MRDS.

⁴ It should also be noted that many officers began with erroneous impressions about the purpose of the study due to lack of complete information from their superiors. Some felt that they were the ones actually being evaluated, while others were worried that a team of "evaluators" and an air of fiscal restraint implied that MRDS might be taken away from them. Consequently, there may have been a bias toward showing us how much they used the system, at least until the point where our research assistants could convey and convince officers of the true purpose of the research.

we compiled did not index counts of responses. Instead, it was recognized that a query received a response in virtually all cases. In order to arrive at some estimate of message volume from the observational data, the number of queries need merely be doubled. Percentages, however, are, of course, not affected.

Factors Affecting Radio and MRDS Use

Temporal Factors

It is to be expected that MRDS usage varies over time according to the general level of police activity. Figure 2 shows the average number of accesses per hour. Beginning at 0700 hours, total activity rises to a plateau of about 160 messages per hour over the whole system before peaking dramatically at about 300 messages per hour between 2100 and 0200 hours. Activity drops again to about 40 messages per hour between 0200 and 0700 before rising again.

Shifts

Changes in usage between shifts were evident, as may be seen in Table 7. While use of most MRDS forms is almost equal

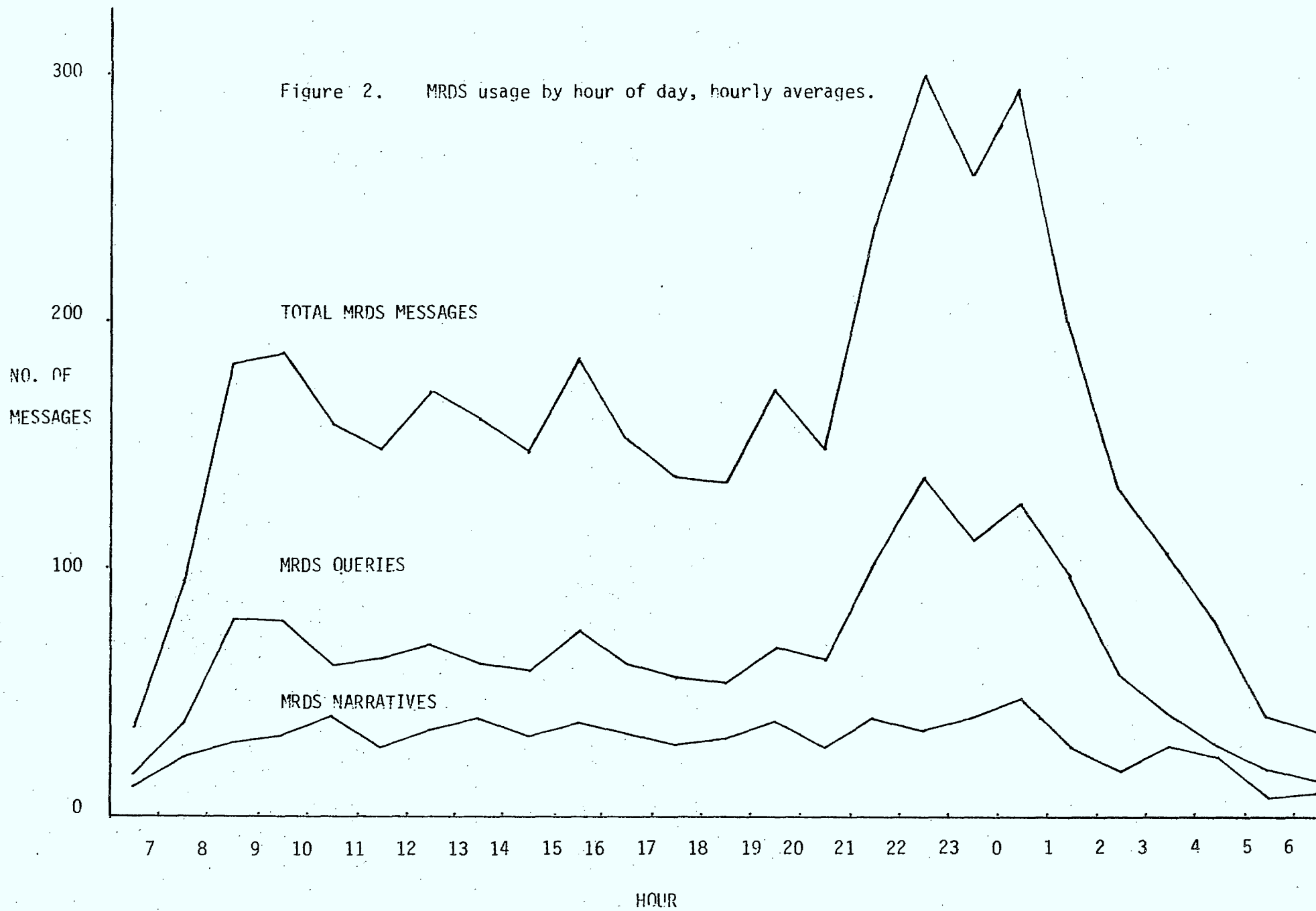


Table 7
MRDS Use By Shift

Form	Shift		
	Alpha	Bravo Charlie Delta	Echo
1. Vehicle Registration	29.8%	20.5%	11.2%
2. Person	11.5	14.7	19.5
3. Property	0.0	0.3	0.2
4. Vehicle Plate	39.3	44.5	51.6
5. Driver's License	3.5	1.1	1.7
6. Status	1.5	2.7	0.7
7. Narrative	10.3	9.9	11.5
8. Signon	4.0	5.8	3.5
9. None of the Above	0.3	0.3	0.0
Total	n = 400	n = 361	n = 401

between shifts, vehicle plate checks increased from 39.3% to 44.5% to 51.6% across Alpha shift, Bravo, Charlie and Delta shifts,⁵ and Echo shift, respectively. Person queries increased from 11.5% to 14.7% to 19.5%, while vehicle registration queries decreased from 29.8% to 20.5% to 11.2%. Two kinds of behaviour

⁵ These three shifts were combined since all are essentially afternoon shifts, and the number of observations for Charlie and Delta shifts alone were small.

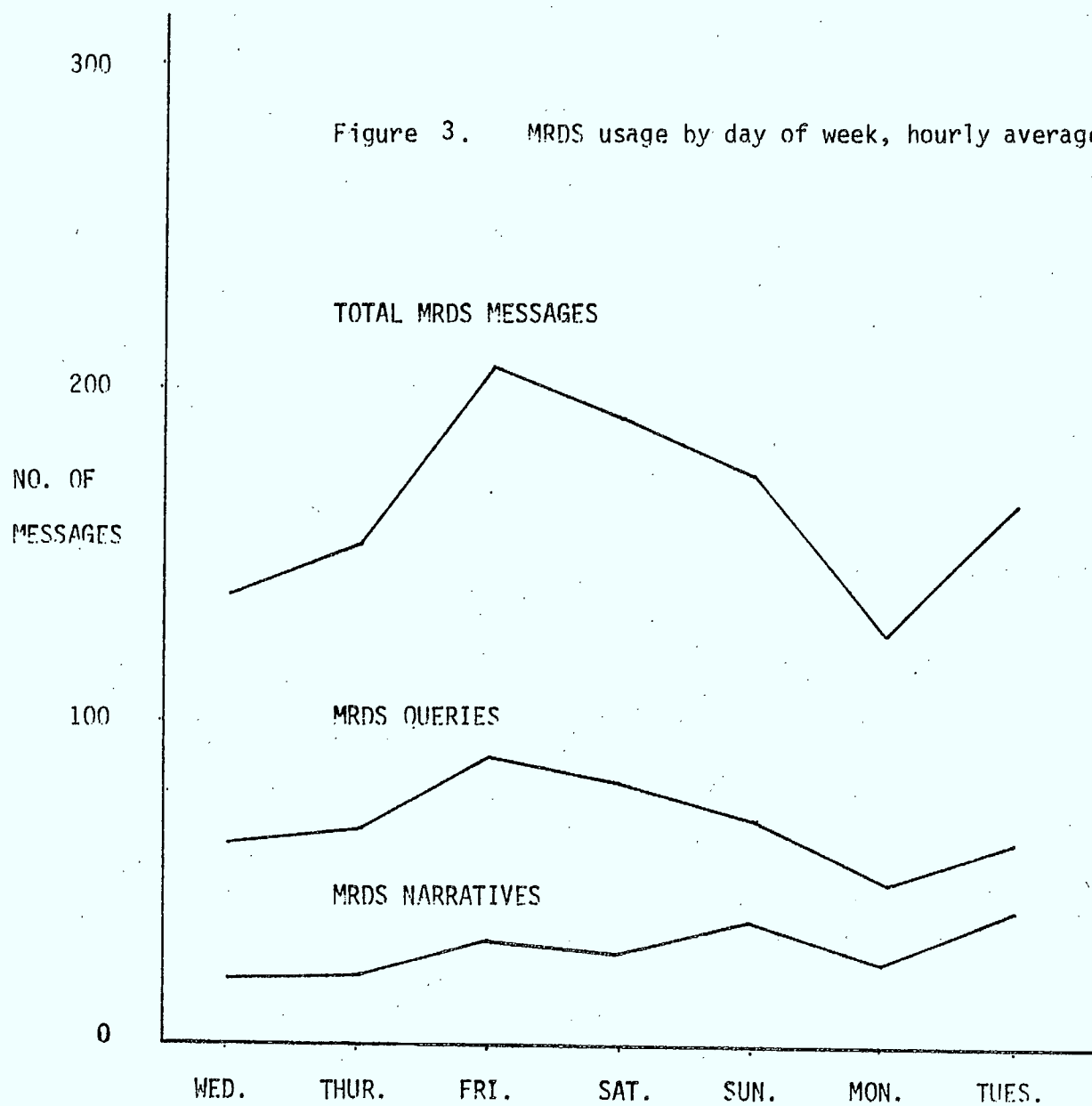
noted by our observers may help explain these results. The first is that, in general, as activity increased, more vehicle plate queries and person queries were made. Second, as time permitted, officers would often follow a vehicle plate check with a vehicle registration check, and then a person check on the registered owner, but these subsequent queries would not be done if officers were busy.

Day of the Week

Figure 3 shows MRDS usage by day of the week for total MRDS messages, total queries, and total narratives. Total responses are not shown in either Figure 2 or 3 since they equalled total queries almost exactly. The hourly averages for day of the week show, as expected, highest values for Friday and Saturday, with lowest values for Monday through Thursday.

Activity

Observers coded transactions with respect to why they occurred, ie., whether the transaction (1) resulted from a dispatch directive; (2) was initiated by an officer because of some suspicion about an individual, vehicle, or event; or (3) occurred for no other reason than that the level of activity was



lull and time was available. The prototypical example of a "lull-time" MRDS transaction was patrolling a parking lot and "running license plates".

Table 8 shows MRDS usage by reason for transaction. It reveals that transactions resulting from dispatch are mainly narratives (35%) and sign-on forms (31%), with vehicle registration, vehicle plate and person queries occurring in 21% of dispatch initiated interactions. When initiated by an officer's suspicion, transactions were predominantly vehicle plate queries (46.5%), person queries (27.9%), and vehicle registration queries (20.9%), with these categories accounting for 95% of transactions. During lull times, however, person queries dropped to 3.9%, while vehicle plate and registration queries accounted for 78.9% of transactions. Narratives totalled less than one per cent of suspicion-initiated transactions, but comprised 14% of transactions during lull times.

The notion that MRDS in some sense provides a focus for what would otherwise be 'lull' time is supported by the finding that almost 47% of MRDS transactions were during lull periods versus 17% of radio transactions. The MRDS system is readily available when an officer's suspicions are aroused. This accounted for 44% of MRDS transactions but only 16% of radio transactions. Radio messages were classified as resulting from dispatch 67.5% of the time, as opposed to 9.1% of MRDS messages

Table 8
MRDS Use By Reason For Transaction

Form	Reason For Transaction		
	Dispatched	Suspicious	Lull
1. Vehicle Registration	6.0%	20.9%	25.4%
2. Person	12.0	27.9	3.9
3. Property	2.0	0.0	0.0
4. Vehicle Plate	3.0	46.5	53.5
5. Driver's License	2.0	3.7	0.9
6. Status	8.0	0.2	1.6
7. Narrative	35.0	0.6	14.1
8. Signon	31.0	0.0	0.2
9. None of the Above	1.0	0.0	0.2
Total	n = 100	n = 484	n = 510

(see Table 9).

Consequences to MRDS Use

We noted earlier that anecdotal commentaries in the police 'trade' literature and by our interview respondents suggested that MRDS was a valuable aid to policing in that it enhanced officer efficiency by increasing the number of 'hits' obtained.

Table 9

MRDS vs Radio Use By Reason for Transaction

Reason For Transaction	MRDS		Radio	
	No.	%	No.	%
Dispatch	100	9.1	543	67.5
Suspicion	484	44.2	126	15.7
Lull	510	46.6	135	16.8
Total	1094		804	

But does it?

There are two ways this question can be addressed empirically. First, one can ask the relative question of whether officers with MRDS-equipped cars are in some sense more efficient than some other group in, for example, producing more arrests. This would require one of two comparison groups -- (1) the same officers or force prior to MRDS; or (2) the same or a comparable set of officers in radio-only cars -- neither of which was possible given the financial and temporal constraints of the current study. But second, one can also ask the question in an absolute sense, ie., was there any evidence that MRDS helped 'produce' arrests in the context of our research? Fortunately, our observers coded the consequence associated with each MRDS and radio access. Also coded was their judgement of

whether each consequence was in some sense 'due' to MRDS, or whether it was incidental to the presence or use of MRDS (eg., the arrest would have occurred anyway, but MRDS happened to have been used to request information about the suspect).

Complete data were available for 1156 MRDS accesses. Strikingly, a full 898 (or 77.7% of) accesses produced no consequence at all. On the other hand, 14 (or 1.2% of) accesses were associated with an arrest being made. Interestingly, 13 of these were associated with the 'person' query, while the 14th resulted from a license plate query. Regarding the role of MRDS in these arrests, our observers judged 9 of the 14 arrests to be directly attributable to the presence and use of MRDS. And while 9 is not a terribly large number, considering the number of hours our observers spent in the field and the number of accesses they witnessed, it is nonetheless true in an absolute sense that our observers witnessed 9 arrests that, in their judgement, would not otherwise have occurred. A determination of the costs and benefits associated with this statistic is obviously beyond the scope of this study. At the least, however, our data demonstrate that (1) there is some support for the notion that MRDS helps 'produce' arrests; and (2) policing has a high dross rate.⁶

⁶-----
For the uninitiated, this term, coined by Webb, Campbell, Schwartz & Sechrest (1966) in Unobtrusive Measures, refers to the amount of time that must be invested before some 'criterion' event occurs. When there is a high investment with few 'concrete' results, the dross rate is said to be high. If, on the other hand, virtually every observation led to a criterion

Comparing MRDS and Voice: Usage

In discussing attitudes toward MRDS earlier in this report, we noted that while attitudes toward the system were almost uniformly positive, it would be erroneous to conclude that officers necessarily prefer MRDS to other media. The section above showed how MRDS usage varied by time and other factors, as revealed by our observational data. We will now delve into this question further by exploring more of the questionnaire data.

Included in the questionnaire were two questions in which officers were directed to nominate situations in which they were likely to use MRDS and Radio. The first question stated:

"In the spaces below, begin by listing up to three types of situations in which you would use MRDS in an average policing day. Then indicate, for each situation (i) how MRDS is useful in that situation; and (ii) what you would have done in that situation before MRDS came along."

We assumed that officer's nominations of situations would be influenced by a saliency bias (e.g., see Kahneman, Slovic & Tversky, 1982), such that they would be most likely to nominate situations where they used MRDS most frequently and/or where the use was in some way most important to them. In this way, we

⁶ (cont'd) event (eg., an arrest in this case), the drop rate would be low. It is clear that policing has a high drop rate in so far as much time is spent driving around and observing before anything actually 'happens'.

would be able to pursue further queries (e.g., ways MRDS is useful) on grounds that would be meaningful for each respondent.

This was indeed the case. In their first situation, officers nominated vehicle checks more frequently than any other use, which was in concert with the observational data that revealed this to be the most commonly used MRDS form. Person checks predominated in the second situation, and so forth. Of the 205 officers who completed the questionnaire, 16 did not answer this question, 1 offered only one situation, 12 offered two situations, and 176 offered three situations in which they found MRDS useful, i.e., a total of 553 situations were generated. Of these, vehicle checks were noted most frequently, and accounted for 173 (or 31.3%) of the situations. Vehicle checks were followed in decreasing order of frequency by person checks (167 situations or 30.2% of the total), messages involving the MRDS "narrative" form (100 situations, or 18.1% of the total), registered owner queries (91 situations, or 16.5% of the total), and property queries (22 situations, or 4% of the total).

In response to the question of how MRDS was useful in that situation, officers occasionally noted more than one way MRDS was helpful. Up to three were coded, resulting in a total of 850 specifications of advantages of MRDS. A full three-quarters of these were accounted for by three main attributes: (1) The speed

and ease with which information could be obtained (noted 222 times, or 26.1% of the total); (2) The mere fact that the information was available and so facilitated their effectiveness as officers (noted 215 times, or 25.3% of the total); and (3) That the lack of radio involvement meant one wasn't bothering the dispatcher, didn't have to worry about radio congestion, and hence could run as many queries as desired (noted 209 times, or 24.6% of the total). Respondents also noted that MRDS was advantageous in so far as queries and messages were private and confidential (noted 87 times, or 10.2% of the total), such that non-police listeners could not monitor messages, and other police officers would not be able to monitor one's activity level. Respondents also felt that MRDS enhanced safety by giving information about whom one was approaching (noted 38 times, 4.4% of total), allowed better and more accurate retention of information since it appeared and stayed on the screen (noted 28 times, 3.3% of total), and meant less imposition on certain members of the public since they could be checked, superficially at least, without actually stopping the vehicle (noted 23 times, 2.7% of total).

The cross-tabulation of situations with advantages appears in Table 10. Note that speed, lack of radio time imposition, and availability of information are seen as primary advantages for the "query" forms, while confidentiality and privacy receive proportionately greater emphasis with respect to messages.

Table 10
Crosstabulation of Situations and Advantages

Situation	Advantages								Row Totals
	Speed Ease	No air Time	Private	Info Available	Safer	On Screen	Needn't Stop	Other	
Person Query	78	72	12	73	12	13	1	10	271 (31.9%)
Vehicle Query	86	85	0	72	20	5	15	4	287 (33.8%)
Registered Owner Query	33	22	2	55	5	9	5	4	135 (15.9%)
Messages	15	21	73	5	1	1	1	8	125 (14.7%)
Property Query	10	9	0	10	0	0	1	2	32 (3.8%)
Column Totals(%)	222 (26.1%)	209 (24.6%)	87 (10.2%)	215 (25.3%)	38 (4.4%)	28 (3.3%)	23 (2.7%)	28 (3.3%)	850 (100%)

In response to the question regarding what they would have done in that situation prior to MRDS, answers were received with respect to 530 out of the 553 situations originally noted. The vast majority indicated that they would have used the radio (in 373 situations, 70.4% of the total). Other responses included phoning in, using radio channel 5 or phoning, not requesting the information, or merely going ahead without information. The cross-tabulation of situations and MRDS alternatives is shown in Table 11. Finally, although it was not specifically asked or coded, it should be noted that many respondents noted spontaneously on their questionnaires that while the lack of MRDS would have displaced them to another medium, they also would have been more selective in what they requested.

In summary, respondents had no difficulty generating situations in which MRDS was useful, and in elaborating the ways in which it was advantageous. Primary among these was speed and ease of access to information, the lack of worry about radio congestion, the utility the information had for policing, and the privacy it afforded their communications and activity. But while these are the advantages which were most salient to the officers, others became apparent both in the questionnaire and in our interviews with officers during the observational ridealongs. Some of these have been noted in the "Attitudes" chapter of this report (Chapter IV) while others will appear in the next chapter regarding implications of MRDS use.

Table 11
Crosstabulation of Situations and Pre-MRDS Alternatives

Situation	Pre-MRDS Alternatives						Row Totals
	Use Radio	Use Phone	Radio/Phone or Meet	Not Do it	Act without Information	Other	
Person Query	132	3	12	3	6	4	160 (30.2%)
Vehicle Query	147	1	3	8	8	2	169 (31.9%)
Registered Owner Query	56	4	9	8	6	1	84 (15.9%)
Messages	22	34	38	2	0	1	97 (18.3%)
Property Query	16	1	1	2	0	0	20 (3.8%)
Column Totals(%)	373 (70.4%)	43 (8.1%)	63 (11.9%)	23 (4.3%)	20 (3.8%)	8 (1.5%)	530 (100%)

Nonetheless, one "inadvertent" advantage of MRDS that might be noted now concerns the response latencies which seem inherent in the system. Some officers complained about the time it took to get information when the vehicle being queried was wanted for some reason. For the most part, however, officers came to view response latency as an important bit of information itself, since a delay in return implied that one likely had a "hit". It may be noted that we found this out somewhat serendipitously when we originally attempted to time the period from receiving the response to the officer's decision to act, and found them frequently reacting before the response was obtained. It may be noted that response latencies over the radio do not have the same information value since delays may merely be a reflection of dispatcher workload.

The questionnaire data summarized above reaffirms the generally high regard in which officers held the system. Yet to say that MRDS was relatively superior on the basis of these data would be inappropriate. This was partially reflected in the attitude item "Given a choice between using the radio or MRDS to get information, I'd rather use the radio", which we discussed earlier, and with which a significant number of officers agreed. It is also reflected in their responses to the item "I can envision the day when we get rid of our radios completely and do everything on MRDS". Of the 204 persons who responded to this question, 168 (or 82%) strongly disagreed, while a further 22

(or 11%) disagreed somewhat. Only 2 persons (or 1%) agreed strongly with the statement, while 5 (or 2%) agreed somewhat. Seven persons felt neutral or had no opinion. Radio would thus not seem to be in danger of obsolescence. But what advantages do officers see in it?

That question was addressed directly by an item similar to the situationally based MRDS item discussed earlier. The question stated

"In the spaces below, begin by listing up to three types of situations in which you would use radio in an average policing day. Once you've done that, indicate for each situation (i) why radio is most useful to you in that situation; and (ii) which you would prefer using, MRDS or radio, if either could be used in that situation."

In response to the question, 6 officers noted only one situation, 31 noted two, while 135 noted 3 different situations in which radio was used. A total of 473 situations were thus generated; these are listed by type in Table 12 in decreasing frequency of mention. In perusing the table, one is first struck not only by the differential popularity of situations here relative to the MRDS situational list, but also by the greater variety of situations mentioned. Significant is the appearance of more stressful and activity-based situations as opposed to the information search activities associated with MRDS. It should be noted that the largest category -- messages -- typically referred to a sharing of information between the officer, dispatch, and other units. In general, two types of situations

dominated the list: (1) stress or action situations involving pursuit, presence at a crime scene, or officer in trouble; and (2) short interchanges such as notifying dispatch about a coffee break or other change in status.

In answer to the question of how radio was useful in the situations noted, a total of 627 responses were coded (up to two advantages per situation were coded). These are listed in Table 13 in decreasing order of frequency. What becomes clear is that while officers liked MRDS because of (1) the speed with which information could be accessed; and (2) the privacy it afforded their activity and messages, they liked radio because of (1) the speed and ease with which messages could be transmitted; and (2) the publicity it afforded their activity and messages. Regarding speed and ease, officers noted that it was easier to broadcast simple messages like status changes over the radio than it was to call up the appropriate form and type it into MRDS. Further, voice messages and requests were easily relayed even when engaged in simultaneous activities such as being in pursuit or driving normally, while typing a message into MRDS required one to divert attention from the scene or road.

On the second dimension -- publicity -- it was clear from reading the questionnaires that officers enjoyed the collegiality that radio offered, and the safety it entailed. Because all units who were using that channel, and the

Table 12
Situations in Which Radio Is Used

Situation	Number of Times Noted (%)	
Messages	154	(32.6%)
Pursuit/Scene of Crime	85	(18.0%)
Person Query	63	(13.3%)
Vehicle Query	54	(11.4%)
P.C. In Trouble	35	(7.4%)
Out of Car	28	(5.9%)
Breaks/Status Change	18	(3.8%)
Check Multiple Persons	11	(2.3%)
Registered Owner Check	10	(2.1%)
Property Query	9	(1.3%)
Other	9	(1.3%)
Total	473	

Table 13
Advantages of Radio

Advantage	N of Times Noted (%)	
Others are aware of one's location, situation	193	(30.8%)
Speed or ease of use	167	(26.6%)
Can be doing other things (eg., driving, watch suspect)	49	(7.6%)
Portable	34	(5.4%)
Gives access to information	29	(4.6%)
Other units can give helpful information	26	(4.2%)
Can broadcast to all units	24	(3.8%)
Likes voice contact	24	(3.8%)
Aware of what others are doing, support available	17	(2.7%)
Help immediate	13	(2.1%)
Works better than MRDS	5	(0.8%)
Other than above	28	(4.5%)
Not useful in sit'n noted	18	(2.9%)
Total	627	

dispatcher, could hear what one was saying, it gave a better feel for where other officers were, and how much strength was on the road. No less important was the fact that everyone knew where you were if a troublesome situation arose. Officers also

noted that when making requests of the dispatcher, other officers would also hear the request and could/would volunteer relevant information if they had it. And finally, officers liked the portability of radio; it could go wherever they went.

A final question asked officers to indicate, for the radio situations, whether they would prefer to use voice or MRDS if both were available. The result was quite clear. Out of 452 situations for which responses were noted, officers preferred voice in 318 (or 70.4%). MRDS was preferred in 107 (or 23.7%); most of these were in the information query categories which overlapped with MRDS forms. Twenty-three (or 5.1%) situations had "both" noted, i.e., MRDS for information but the voice channel to broadcast location. In a final 4 situations (or 0.9%), the respondents indicated they couldn't say.

In sum, this section of the questionnaire more than any other helped to underline the point that both MRDS and radio have their advantages and disadvantages. Officers were very enthusiastic about MRDS. Yet it was clear from this section that they also appreciated radio. It would probably be safe to assume that officers like the flexibility of having both, since it allows them to police according to their own interpersonal and investigative style.

VI. Implications of MRDS Usage

Officer Perceptions

Early in the questionnaire that we administered to officers, we requested that they indicate, in open-ended fashion, their overall evaluation of MRDS and to delineate what they felt were advantages and limitations of the system. Their overall evaluations were discussed earlier in this report. With respect to the advantages and limitations they delineated, we differentiated between statements which focussed on attributes of the system per se, versus those which addressed implications of the system on some other system or on some aspect of policing. Their comments concerning attributes of the system were discussed earlier. We will now focus on the implications of MRDS which were identified both in the questionnaires and in supplementary interview material.

As was noted before, the advantages respondents saw in MRDS tended to focus much more on implications of the system rather than attributes (83% of responses versus 17%), while the disadvantages noted tended to be attributes more frequently than implications (89% of responses versus 11%). Of the 167 persons

who specified implication advantages, the positive impact of MRDS on radio congestion was noted most frequently (by 50.3% of those respondents). This was followed in frequency of mention by 59 individuals (or 35.3%) who made general statements to the effect that MRDS helped them be more effective and efficient. At a more specific level, 13 officers (or 7.8%) noted they felt MRDS made their job safer, 6 (or 3.6%) felt it provided the desired level of privacy from non-police monitoring, and 5 (or 3.0%) felt it resulted in an increase in the number of "hits" they obtained.

Only 20 respondents noted disadvantages to MRDS that involved implications. Of these, 12 persons (or 60%) felt that many officers were becoming overly dependent on MRDS to the point where they were letting it make the decisions rather than developing their own intuitive sense. A further 3 individuals (or 15%) indicated they felt MRDS had a negative effect on police safety. This point deserves further discussion; while noted by only three officers in response to this question, it is an important point that surfaced frequently in our interviews with officers.

Those officers who indicated MRDS enhanced police safety revealed in their questionnaires and interviews that they felt this way primarily because MRDS meant "you know who you're dealing with before you approach the vehicle". Those who

focussed on the reduced safety engendered by MRDS disagreed, and it was because of this disagreement in the interpretation of MRDS information that they felt MRDS reduced safety. This latter group tended also to be the individuals who felt that too many officers were allowing the system to make their decisions for them. The disagreement between the two groups is best illustrated by the "code 5" designation generated by MRDS in response to any person-connected query (e.g., person query, vehicle query).

Code 5 means that the individual should be approached with caution because he or she has a history which includes violence, and hence might be hostile to police. All officers do indeed approach these persons with caution, even though many officers are concerned about the breadth of the designation (but that's a consideration to be discussed elsewhere). The major difference between the "MRDS increases safety" and the "MRDS reduces safety" groups, however, lies in their interpretation of what it means when a code 5 designation is not received. "increased safety" group are seen as more likely to interpret lack of code 5 status as implying that the person the approaching is not hostile to the police. Those in the "reduced safety" group more appropriately realize that the lack of code 5 designation can mean one of two things: either (1) the person is indeed not hostile to police; or (2) the person is hostile to police but, for one reason or

another, has not yet been recognized as such and entered into the system. The "reduced safety" group thus approach all persons with caution, including non-code 5 individuals, and continue their vigilance to cues until their "police instincts" tell them that the person is harmless. Their perception of the "increased safety" group is that the lack of code 5 status leads them to be less cautious than warranted.

An additional safety concern that was noted by several officers revolved around the difficulty which arose because of the conflict between "proper police procedure" and hardware attributes of MRDS. Officers are taught in training never to take their eyes off a suspect and never to place themselves in a situation with a suspect where they would be trapped in a specific location. In conflict with this training are two requirements of MRDS: (1) one must divert one's attention to the terminal when typing in requests or reading response information; and (2) the terminal is fixed in the car so that one must be sitting in the car to utilize it. This becomes less of a problem when one is in a two-person unit, since one individual can focus attention on the suspect(s) while the other accesses the system, but officers on solitary patrol must deal with that conflict. Our observers reported that many officers do follow the "appropriate" procedure of asking for information over the radio. Nonetheless, many officers are seduced into violating procedures because of the speed and privacy of MRDS

query and response.

Beyond the "safety" and "dependency" issues discussed above, some of our respondents noted other "disadvantage implications" in their questionnaires. Two persons (or 10%) felt that MRDS encouraged officers to violate individuals' privacy. Our observers reported innumerable instances where officers would run vehicle plate numbers or person's names through the system purely because they were there. Some officers justified this because (1) it was easy to do; (2) they felt it resulted in an increased number of "hits"; (3) most of the time people didn't even know they were being checked (the implication being that they thus would not care); and (4) that running a vehicle plate through MRDS was less of an imposition to the driver than pulling a vehicle over. Other officers expressed concern regarding what they perceived to be an "over-use" of the system, and felt that (1) one should not run a vehicle or person through MRDS unless one had "reasonable grounds" to do so, i.e., where the grounds were sufficient to have bothered the dispatcher about it in the pre-MRDS days; and (2) the "run through everything and everyone you see" philosophy encouraged over-dependence on the system, and discouraged the development of police "instincts".

Finally, three further respondents (or 15%) indicated specifically that they felt MRDS dehumanized policing. The

rationale underlying these concerns would seem similar to those already discussed regarding safety, privacy, and dependency on the system. Actually, 'depersonalized' might be a better descriptor of this attitude than 'dehumanized'.

While the number of officers voicing the above concerns in their questionnaires was not large, it should be noted that it was not atypical for officers to mention them in the interviews. In addition, some of the structured questionnaire items spoke to these issues, so that we can see the extent to which they were shared among the 205 officers who completed the questionnaire. These items, along with the distribution of responses associated with them, are shown in Table 14.¹ In general, these data show that respondents felt MRDS has had an impact on policing, that they are more effective because of it having been implemented, that radio access is easier, that more persons and vehicles are being checked (including ones that wouldn't have been otherwise), and that they are more independent of dispatchers. On the other hand, there is more variability among officers concerning how MRDS has affected their relationship with the community, whether it has increased or reduced safety, and whether it has in some way dehumanized or depersonalized policing.

¹ It should be noted that questions directly addressing the privacy issue were included in the initial draft of the questionnaire, but were deleted or reworded at the request of VPD.

Table 14
Distribution of Responses to Questionnaire Items
Regarding Implications of MRDS on Policing

Item	No. Of Officers Responding	Strongly Disagree N (%)	Disagree Somewhat N(%)	Neutral No Opinion N(%)	Agree Somewhat N(%)	Agree Strongly N(%)
I think MRDS makes policing a lot safer	204	8(4%)	23(11%)	27(13%)	89(44%)	57(28%)
I think MRDS helps me be a more effective officer	204	5(2%)	7(3%)	26(13%)	104(51%)	62(30%)
I find that with MRDS, I end up relying on the system more and more	203	7(3%)	42(21%)	39(19%)	99(49%)	16(8%)
MRDS is a nice toy, but it hasn't affected policing at all	204	106(52%)	71(35%)	17(8%)	5(2%)	5(2%)
Getting radio access in peak times is a lot easier now with MRDS	203	8(4%)	20(10%)	25(12%)	85(42%)	65(32%)
Ultimately, I think MRDS dehumanizes policing	202	96(48%)	56(28%)	34(17%)	11(5%)	5(2%)
I find I check out a lot more people on CPIC now than I did before MRDS	203	2(1%)	14(7%)	20(10%)	91(45%)	76(37%)

Table 14 cont'd...

Item	No. Of Officers Responding	Strongly Disagree N (%)	Disagree Somewhat N(%)	Neutral No Opinion N(%)	Agree Somewhat N(%)	Agree Strongly N(%)
I find I check out a lot more cars/licences with MRDS than I did before	204	3(1%)	5(2%)	3(0%)	51(25%)	142(70%)
I feel more independent of the community with MRDS	204	44(25%)	50(25%)	90(44%)	17(8%)	2(1%)
MRDS makes me more independent of the dispatcher	204	2(1%)	16(8%)	22(11%)	129(63%)	35(17%)
With MRDS, I probably investigate cars or people I wouldn't otherwise have bothered with	204	3(1%)	15(7%)	20(10%)	102(50%)	64(31%)
MRDS can create a false sense of security with suspects	204	40(20%)	79(39%)	41(20%)	36(18%)	8(4%)

Radio Spectrum Utilization

Our evaluation of MRDS represented a multi-methodological post hoc inquiry into several different aspects of the system. Its multi-methodological nature meant that, to the extent that our results converged, we could be fairly confident in our conclusions. The post hoc nature of our evaluation, however, imposed certain constraints in what we could investigate, and hence about which we could make informed conclusions. We feel most confident in our description of current attitudes regarding MRDS and of current user behaviour. We also feel pleased about the extent to which important research issues regarding the implications of MRDS have been identified and, because of our familiarity with the system and interaction with its users, feel comfortable speculating about possible implications which deserved further investigation. But the reader should nonetheless appreciate that any statements we might make concerning changes due to the implementation of MRDS are indeed statements of speculation; more definitive statements would require a longitudinal evaluation (ie., begun prior to implementation of the system, and thus allowing before/after comparisons) and/or access to other comparison groups (eg., another, comparable, non-MRDS equipped police force), coupled with more intensive and extensive observation than was possible

in the current study.

Given these caveats, a question of interest to the Department of Communications concerned the impact of MRDS on radio spectrum utilization. Although MRDS was never intended as a replacement for voice, it was originally believed that by diverting to MRDS a good part of the function that the voice channels had served, the demand for voice channel time might be minimized, hence potentially freeing one or more radio channels for other uses. To the extent that we have been able to address this question in the course of our investigation (within the constraints noted above), and given the current specifics of MRDS as implemented at VPD, we would speculate that the less-than-capacity use of voice channels envisioned prior to MRDS will fail to materialize. There are several reasons for this, most of which have been alluded to earlier in other contexts:

1. There are many situations where MRDS could be used (ie., it offers the appropriate functional attribute), but is not, due to the fact that use of the system (eg., when driving; when dealing with suspects) would require violation of standard operating procedures.
2. Voice communication remains the medium of choice for many officers, and by all officers in many situations (eg., stressful situations; for trivial messages).
3. The voice channels also fulfill a social and collaborative

function beyond mere information transmission that MRDS cannot duplicate.

4. Current MRDS hardware does not allow voice input, nor does it offer the option of voice synthesis reply, thus limiting its contextual flexibility for both input and output of information. Its lack of portability and non-universality at VPD also serve to constrain its utility, and hence encourage voice communication.
5. The notion that the introduction of MRDS would result in a reduced voice load seems to have rested in no small part on the assumption that the voice channels were operating at capacity (at least in peak busy times) prior to the introduction of MRDS, and that this capacity utilization was a legitimate reflection of voice channel demand. Our interview and questionnaire data lead us to question whether this "demand" was truly reflected, however, since officers frequently indicated that, prior to MRDS, one had to be selective in the requests one made to the dispatcher. In other words, it would appear that officers, in effect, assigned a sort of "subjective priority" to their need to know some bit of information, and that the cut-off criterion as to when a request could "legitimately" be made to the dispatcher would change, depending on the overall level of activity. Viewing the situation in this manner yields the implication that introducing MRDS would probably not alter the overall level of voice activity (as measured by voice

channel utilization), but would merely cause a readjustment of the cut-off criterion.

In sum, it would seem we have here a variant on Parkinson's Law, i.e., that voice channel utilization will expand to fill the amount of airtime available. It would be possible to address these questions empirically in some future study involving extensive observation and content coding of voice communications; at present, our data only indicate the possibility of this dynamic.

6. Finally, there is some evidence to indicate that the advent of MRDS may actually serve, indirectly, to create greater demand for voice communication. Because of the ease of operation of the system and immediacy of response, there is no need for officers to generate the "subjective priorities" alluded to above, when using MRDS. If the comments of many of the (particularly more senior) officers of VPD are to be believed, then it may be speculated that MRDS fosters reduced selectivity, which may further generalize to greater demand for voice access during down-time and when in non-equipped vehicles.

In sum, the points above lead us to conclude that given the current attributes of MRDS and the way it has been introduced at VPD, efforts to reduce the number of voice channels to VPD would have an adverse impact. The degree of adversity would be reduced

if all cars at VPD were MRDS-equipped and if the reduction in channels occurred at the same time the whole fleet became MRDS-equipped. This statement is based on the speculation that widespread implementation of MRDS causes an "unfreezing" of voice practice, particularly with respect to the "subjective priority" process noted earlier, such that implementation of MRDS coupled with a reduction in voice channels would foster "re-freezing" at levels suitable to both MRDS and radio. On the other hand, the widespread implementation of MRDS followed by a reduction in voice channels would create an adverse effect since the "thawing" and "re-freezing" associated with implementation of MRDS would then imply that the subsequent reduction in radio channels would create a loss in communicative capability rather than being a part of communication reorganization. Please note, however, that these speculations are derived from impressionistic data, and that the ideas on which they are based require more systematic scrutiny in a study devoted expressly to those questions.²

² It should also be noted that the number of voice channels available to VPD is intricately tied to the team organizational structure, and would undoubtedly have an impact in that realm. We do not have the appropriate information to speculate on what those impacts might be.

Organizational Impacts

Thus far we have spent considerable time focussing on the patrol officers of VPD and their relationship with MRDS. But there is another group within VPD -- the dispatchers -- who deserve some space here, since the advent of MRDS has had and will have an impact on them as well. Four of these persons (all dispatchers on one shift) were interviewed informally by one of the field coordinators. In her judgement, the reactions of the dispatchers to MRDS were quite in contrast to those of the patrol officers.

To understand their position, one must first recall that, for officers, MRDS represented a new technological innovation that they can choose to use in whatever manner suits their investigative style. The dispatchers, on the other hand, have already had extensive experience with the CPIC system, and, in general, seem to view MRDS as a less efficient replacement that is being forced upon them. They are sceptical about the promises of MRDS's future, and cite CPIC's problematic history as a case in point. They dislike the 'forms' format of MRDS, and noted that the CPIC format allowed multiple points of information to be requested simultaneously, and is more complete. CPIC has modified their 'persons' file, for example, so that a driver's license number automatically accompanies responses to this

inquiry. This apparently is not available with MRDS, but would be a good addition, since the Victoria Driver's License division (which supplies this information to MRDS) operates only during working hours.

The dispatchers are negative about other aspects of MRDS as well. They stated that response time for MRDS was longer than response time for CPIC. They like the hard copy they receive from the CPIC terminal, since it allows them to go back over earlier inquiries rather than requiring them to repeat their request. In response to the assertion that MRDS would eventually deliver hard copy as well, they replied that the MRDS machines generate more noise than the CPIC terminals.

The dispatchers claim that although MRDS is currently available to them, they still use the CPIC terminals almost exclusively. At present, their use of MRDS seems confined to an occasional use of the 'narrative' feature for confidential messages when monitoring by non-police personnel is a concern. However, since many units are not yet equipped with MRDS, the dispatchers still rely heavily on the phone-in procedure.

The reactions of the dispatchers to MRDS was so in contrast to that of the patrol officers of VPD as to be striking. Although they did not articulate it, one can see that while the patrol officers have everything to gain by the advent of MRDS,

the dispatchers have everything to lose. Where they were once in a pivotal position and expert in the system (ie., CPIC), their role is gradually being reduced, and they, too, are in the role of naive users of a new, and, in their eyes, less efficient system. It is not yet clear how these attitudes will influence the way they carry out their role.

VII. Concluding Remarks

Three primary issues have guided our behavioural evaluation of the Vancouver Police Department's Mobile Radio Data System: (1) An assessment of attitudes of system users toward the system; (2) An assessment of how the system is used, and of parameters affecting its use; and (3) An assessment of the implications of MRDS on policing. While we have discussed these issues separately in the body of this report, it is clear that they are actually quite difficult to separate.

Although we found that the VPD administration and patrol officers were, on the whole, extremely positive about MRDS, it was also true that considerable variability existed in terms of how the system was perceived and used. For some officers, MRDS was seen as a valuable boon to policing which facilitated both safety and efficiency. They used it frequently and, at the extreme, some might say 'indiscriminately'. They looked forward to access to ever-increasing amounts of information. At the other extreme were those who, although they, too, were generally positive about MRDS, nonetheless expressed some scepticism about the system. Perhaps it would be more appropriate to say they expressed concern that the ease of access to information which MRDS offered would seduce officers, and particularly the younger

officers, into letting the system make their decisions for them. Indeed, these are important issues. An important aspect of policing involves the social skills required to cultivate contacts and deal with the general community; many persons would lose if MRDS were to become a buffer between the police and the community.

In looking back on our research, we are pleased that we chose to focus on radio usage as much as we did, particularly in the questionnaires and interviews. An exclusive focus on MRDS would have shown the positive regard in which it is held by VPD, but would have been overly myopic and ignored the complementary function that radio serves in day-to-day police activity. MRDS and systems like it can be improved in the future through enhanced graphics capabilities, increased memory capacity, the addition of a voice recognition and voice output option, and increased portability, but, from the perspective of VPD, it is difficult to imagine policing without radio. It is an efficient friend for the most trivial (eg., status changes) and most important (eg., officer in trouble) moments, and facilitates the camaraderie that police officers share. Our observations and impressions of the impact of MRDS on radio spectrum utilization lead us to hypothesize that radio air time is a sufficiently valued resource that its partial functional obsolescence by MRDS will nonetheless not be accompanied by reduced demand, at least within the context of current parameters. Stated another way,

MRDS may have negated the need of VPD for more radio channels, but, at least in the foreseeable future, it is doubtful whether they would feel comfortable with less.

Although not directly relevant to the questions which guided our research, we felt that we came across a number of other insights about MRDS that may be of use to VPD and other police departments intending to implement systems of this type. In particular, we would like to draw attention to our observation that MRDS is not perceived to be 'just another tool' in the police armamentarium. It seems that the 'tool' philosophy has guided training up to this point, in so far as officers' introduction to the system has been quite functionally oriented. They are told, in essence, that to get information set A, one pushes button X ...period. While this is sufficient to satisfy the curiosity of some officers, we were quite overwhelmed by the number of officers who expressed an interest in getting to know the system conceptually as well as functionally, and hope that VPD will come to appreciate this. As an aside, it may also be noted that MRDS manuals were not given to all officers during training, which probably accounts for why some of the less 'obvious' forms (eg., the 'property' query, which requires knowledge of property codes) are rarely used.

And finally, while we feel comfortable in the extent to which our research questions have been answered in the current

study, we would like to assert that our study also possesses some inevitable limitations. In the main, these stem from the fact that our evaluation was done on a post hoc basis (ie., after the system had been implemented), rather than as part of an ongoing evaluation which commenced well before implementation was begun. We attempted to ask officers to recall their expectations of the system, but it was clear these data were deficient and hence have not been reported here. And while we feel that our research has identified some important research questions (eg., the implications of MRDS on the nature of police-community interaction; the division among officers in their perceptions of the role that a technology like MRDS can serve), it was impossible to explore these more fully in the current context. Other important issues (eg., public perceptions of issues surrounding police access to information) have been completely bypassed. Some of these issues may still be investigated at another time in Vancouver. But, in the event that a police department in another major Canadian city decides to implement a system like MRDS, we most strongly suggest that a behavioural evaluation be seen a priori as an integral component of the process, and that it be commenced at least one year before the first terminal is delivered. It is only in this way that the inevitable proliferation of systems like MRDS that we foresee can occur in a way most beneficial to all.

APPENDIX "A"

The Questionnaire

MRDS Questionnaire

The following questionnaire is one part of a broader study of the Vancouver Police Department's (VPD's) Mobile Radio Data System (MRDS). An engineering analysis of the system was completed last year. The current study focusses more on the opinions of those who have used MRDS and/or its predecessor, radio-only communication.

Your candid opinions would be appreciated, since it is only through a realistic appraisal of system strengths and limitations that information from a study like this can be used to help in the development of this and other systems.

Please complete the questionnaire at your earliest convenience, but, in any event, by no later than 28 February 1983. Completed questionnaires can be returned to the researchers by submitting them to the Superintendent of your division. Upon completion of the study, the researchers will make copies of the report available to VPD, such that participants will be able to see a summary of the overall results. Finally, note that your responses will be treated in confidence; neither the summary nor any future reports will refer to individual research participants by name.

MRDS Questionnaire

001. Respondent code no. (/ / / /)
(to be filled in by researchers)
002. (/ /) Current rank _____
003. (/ /) Since what year have you been involved in policing, whether
at VPD or elsewhere? _____.
004. (/ /) Since what year have you been involved in policing here at
VPD? _____.
005. (/ /) In what team zone(s) do you usually police? _____
006. When you started policing here at VPD, was MRDS already implemented
or was all communication from patrol cars via radio?
1. _____ all cars were radio only
 2. _____ MRDS was already here.
007. Have you been trained in the use of MRDS?
1. _____ Yes
 2. _____ No
 3. _____ Being trained now

008. (___/___/) About how many months of in-car experience with MRDS do you have at this point, if any?

_____ months

009. (___/___/) Out of your last 10 shifts, how many involved at least some time in MRDS - equipped cars?

_____ shifts.

We'd now like to know something about your expectations of MRDs prior to actually using the system. If you have experience with the system, then please try and think back to that time. If you have not yet had experience with MRDS, then please indicate your expectations. In either case, circle the number that best represents your expectations:

	Strongly Disagree	Disagree Somewhat	Neutral, No Opin.	Agree Somewhat	Strongly Agree	
010.	1	2	3	4	5	I thought MRDS would be a helpful aid to policing.
011.	1	2	3	4	5	I thought MRDS would help me be a more effective officer.
012.	1	2	3	4	5	Ultimately, I thought MRDS would <u>dehumanize</u> policing.
013.	1	2	3	4	5	I looked forward to learning a computer systems like MRDS.
014.	1	2	3	4	5	I felt that MRDS would help make policing safer.

	Strongly Disagree	Disagree Somewhat	Neutral, No Opin.	Agree Somewhat	Strongly Agree	
015.	1	2	3	4	5	MRDS seemed like an interesting toy, but I doubted whether it would affect policing.
016.	1	2	3	4	5	I thought MRDS would affect my dealings with the public.
017.	1	2	3	4	5	I thought MRDS would probably decrease my job satisfaction.
018.	1	2	3	4	5	I felt leery about learning to use MRDS.

The following questions are written in a way that assumes you have had experience with MRDS. If you have not, then please speculate about the answers on the basis of what you have heard and/or know about the system.

019. Now that you've had a chance to use MRDS, how, in general, do you feel about the system?

(__/__/)

020. More specifically, what do you see as the strongest advantages to having MRDS?

(__/__/)

021. What limitations or shortcomings do you see in MRDS?

(__/__/)

(a) in the spaces below, begin by listing up to three types of situations in which you would use MRDS in an average policing day. Then indicate, for each situation (i) how MRDS is useful in that situation; and (ii) what you would have done in that situation before MRDS came along.

1.

Situation	HOW IS MRDS HELPFUL?	PRIOR TO MRDS?
022. (_/_/_/)	023. (_/_/_/)	024. (_/_/_/)
025. (_/_/_/)	026. (_/_/_/)	027. (_/_/_/)
028. (_/_/_/)	029. (_/_/_/)	030. (_/_/_/)

2.

3.

(b) in the spaces below, begin by listing up to three types of situations in which you would use radio in an average policing day. Once you've done that, indicate for each situation (i) why radio is most useful to you in that situation; and (ii) which you would prefer using, MRDS or radio, if either could be used in that situation.

Situation	WHY RADIO IS USEFUL ?	RADIO vs MRDS?
1. 031. (_/_/_/)	032. (_/_/_/)	033. (_/_/_/)
2. 034. (_/_/_/)	035. (_/_/_/)	036. (_/_/_/)
3. 037. (_/_/_/)	038. (_/_/_/)	039. (_/_/_/)

Finally, in the process of reading about and talking to people about MRDS and systems like it, we've heard a number of different comments about good and bad aspects of the system. Some of these are listed below. Please read each one, and then indicate how much you agree or disagree with each statement by circling one of the numbers on the scale that best represents your opinion.

	Strongly Disagree	Disagree Somewhat	Neutral, No Opin.	Agree Somewhat	Strongly Agree	
040.	1	2	3	4	5	I think MRDS makes policing a lot safer.
041.	1	2	3	4	5	I find that with MRDS, I end up relying on the system more and more.
042.	1	2	3	4	5	While MRDS has its advantages, it'll never completely replace radio.
043.	1	2	3	4	5	I think MRDS helps me be a more effective officer.
044.	1	2	3	4	5	MRDS hasn't really affected the <u>amount</u> I use radio, just what I use the radio for.
045.	1	2	3	4	5	MRDS is a nice toy, but it hasn't affected policing at all.
046.	1	2	3	4	5	Getting radio access in peak times is a lot easier now with MRDS.
047.	1	2	3	4	5	Given a choice between using the radio or MRDS to get information, I'd rather use the radio.
048.	1	2	3	4	5	Ultimately, I think MRDS dehumanizes policing.

	Strongly Disagree	Disagree Somewhat	Neutral, No Opin.	Agree Somewhat	Strongly Agree	
049.	1	2	3	4	5	MRDS has had a positive effect on my job satisfaction.
050.	1	2	3	4	5	MRDS provides a good way to kill time during lull periods.
051.	1	2	3	4	5	I find I check out a lot more people on CPIC now than I did before MRDS.
052.	1	2	3	4	5	MRDS hasn't affected what I do as much as <u>how</u> I do it.
053.	1	2	3	4	5	MRDS produces so much information it makes me a less effective officer.
054.	1	2	3	4	5	I find I check out a lot more cars/licences with MRDS than I did before.
055.	1	2	3	4	5	The information available by MRDS is quite adequate as it stands now.
056.	1	2	3	4	5	The more information we have about the people we deal with, the better.
057.	1	2	3	4	5	I would rather work in a radio-only car.
058.	1	2	3	4	5	I didn't really receive enough training in MRDS.
059.	1	2	3	4	5	I feel more independent of the community with MRDS.
060.	1	2	3	4	5	It would be desirable to have even more information on MRDS than we have now.

	Strongly Disagree	Disagree Somewhat	Neutral, No Opin.	Agree Somewhat	Strongly Agree	
061.	1	2	3	4	5	In some instances it takes even longer to get information by MRDS than it did by radio.
062.	1	2	3	4	5	MRDS makes me more independent of the dispatcher.
063.	1	2	3	4	5	I feel tied to my car with MRDS.
064.	1	2	3	4	5	With MRDS, I probably investigate cars or people I wouldn't otherwise have bothered with.
065.	1	2	3	4	5	MRDS can create a false sense of security with suspects.
066.	1	2	3	4	5	With MRDS, I get information much more quickly than with radio only.
067.	1	2	3	4	5	MRDS is of less use in highly stressful situations.
068.	1	2	3	4	5	MRDS is of less use when I'm on patrol by myself than when I have a partner.
069.	1	2	3	4	5	I can envision the day when we get rid of our radios completely and do everything on MRDS.
070.	1	2	3	4	5	Overall, I like MRDS.

This completes the MRDS questionnaire. Thank you for your participation. Please use the space below to make any comments about MRDS that you didn't have an opportunity to express in the questionnaire itself.

Once completed, please submit this questionnaire to the Superintendent of your division, who will forward it directly to the researchers. Thanks again.

APPENDIX "B"

The Interview Schedule

Interview Guide

Introduction:

During the course of this interview I am going to ask questions about specific issues related to the use of MRDS - but to start off - I would like to know your general feelings about the system.

In general, do you like working with MRDS?

What are some of the things you like/dislike about it?

LIKE

-Do you prefer it over radio-only communication?

-Do you feel comfortable about operating it?

DISLIKE

-Do you prefer radio-only communication?

-Do you feel uncomfortable about operating it?

Do you have any comments on the design of the terminal itself?

Is it easy to use?

Do you have problems seeing the keyboard at night?

Would you tell me a little about the training involved in learning to operate the MRDS... for instance

Exactly how long was the training period?

Do you feel that the training was adequate?

Do you have any problems using the system?

Have you discovered anything about the system that was not covered during training? (short-cuts)

Prior to the training session at VPD, did you know anything about MRDS?

Had you ever used one before?

Had anyone told you about their experience working with one?

Had you read anything about MRDS?

Did you have any expectations about working with MRDS?

Now I would like to concentrate on the information retrieval aspects of MRDS.

In what circumstances do you access information on MRDS?

Has MRDS made this kind of information easier to access?

Do you request this kind of information more frequently now that MRDS is available?

Is there any information presently unavailable through MRDS that you would like to be able to access?

We are interested in MRDS affects on police work.

Do you think that MRDS has had an influence on police work in any way?

What are some of the positive effects?

What are some of the negative effects?

Do you think that MRDS has had any effect on police efficiency?

Now, I would like to raise some issues related to MRDS and safety. Overall, would you say MRDS has increased safety?

Decreased safety?

Are there any features that could be added to the system to improve safety?

Does the information on MRDS influence the way that you approach the public?
For example, are you more cautious when checking out cars or persons who have shown up on the system?

Are you satisfied with the codes on the system or do you think they could be improved?

Do you have any suggestions regarding the codes in use?

When you are working alone do you prefer an MRDS equiped unit?

What are some of the benefits?

What are some of the disadvantages?

Police work can be very stressful at times - Are there instances in which MRDS affects that aspect of your work?

Is MRDS useful in emergency situations?

Have you found using MRDS frustrating in any way?

Have you had any problems getting information you have requested?

Overall, would you say that MRDS is a reliable method for obtaining the information you need?

Are system-down periods fairly infrequent?
fairly short?

Do you rely on MRDS for information you would normally request from the public?

Do you find that MRDS is a good way to check the validity of the information you get from the public?

Do you check the information routinely or only under certain circumstances?

What circumstances?

Has MRDS made your work seem impersonal in any way?

For example, do you feel that you have less human contact during a shift since MRDS was implemented?

I think that we have pretty well covered all the issues now - but you are much more experienced with MRDS - Are there any areas that you would like to expand on or comments you would like to add?

Okay - to wrap this up - Please identify the most

Advantageous thing about MRDS.....

The most disadvantageous.....

APPENDIX "C"

Observational Coding Form

/	/	-	/	/	/	/	/	/	/	-	/	/	-	/	/	/	/	-	/	/	/	/	-	/	/	/	/	-	/	/
C/T			Day		Mon			Yr		D of Wk				Duty				1								2				Obs.

Start time	Per. 1	Per. 2	O R I G I N	D E S I G N	M R D S / R A D	T Y P E	F O R M	W H Y	R E S P	C O N S	M / I N	End Time
/ / / /	/ - / / /	/ - / / /	/ - / / /	/ / / /	/ - / / /	/ / / /	/ - / / /	/ / / /	/ / / /	/ / / /	/ - / / /	/ / / /

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MRDS EVALUATION
CODING MANUAL

OBSERVATION FORM

C/T - Car/Tape
 C - All in-unit observations
 T - All radio tape coding

DAY - Day
Mon - Month
YR - Year

D of W - Day of the Week
 SU - Sunday
 MO - Monday
 TU - Tuesday
 WE - Wednesday
 TH - Thursday
 FR - Friday
 SA - Saturday

DUTY - Team/Shift/Unit
 Team Number - 1 through 8
 Shift - A 7:00 - 17:00
 B 16:00 - 2:00
 E 21:00 - 7:00
 C 17:00 - 3:00
 D 18:00 - 4:00
 Unit - Police Vehicle Number

1 and 2 - Coded Officer's Identity Number (P.I.N.)
 1 - A
 2 - B
 3 - C
 4 - D
 5 - E
 6 - F
 7 - G
 8 - H
 9 - I
 0 - J

OBS - In-Unit Observer's - 1st Initial - Common Name
 L - Larry Banks
 S - Susan Bluck
 C - Clinton Langille
 J - John Olver

Start Time - 24 Hour Clock - Time observation period begins

PER 1. - Micronta Stopwatch used to capture the length of time between the start and end of each communication (Enquiry/Information)
RADIO - From identity to message completion
MRDS - From start typing to send

PER 2. - Micronta lapse-time feature used to capture the length of the total interaction - from the start of each communication to the end of the reply.

ORIGIN - The initiator of the communication
U - Unit (Unit to Dispatch/Unit to Other Unit)
D - Dispatch (Dispatch to Unit/Dispatch to All Units)
O - Other Unit (Other Unit to Unit)
A - All Units

DEST - The destination of the communication
U - Unit
D - Dispatch
O - Other Unit
A - All Units

Note: When Unit uses MRDS - the destination is either left blank or coded U

MRDS/RAD - MRDS/RADIO
M - MRDS
R - Radio

TYPE - IN - Information
EN or EQ - Enquiry

FORM - The form of the communication/enquiry/information
VE - Vehicle (Serial Number)
PE - Person
PR - Property
LI - License (Automobile License Plates)
DL - Driver's License
ST - Status (Throughout shift - after initial sign-on)
NA - Narrative
SO - Sign-On (Start of Shift Only)
NO - None of Above

MRDS - The actual form appears on MRDS screen
RADIO - Voice communication

- WHY - What was the reason for this enquiry?
SE - Unit was sent by dispatch and required more information
SP - Officer was suspicious about person/vehicle
LU - Officer was not otherwise occupied and decides to check vehicle/person
- RESP - The response to the communication
NO - None
BU - Busy
ER - Error in the communication
HI - Successful Response
MI - Information
- Note: HI stands for HIT and is to be recorded when the requested information results in a positive reply. That is, there are outstanding warrants, tickets, etc. Since MRDS does not access criminal records, charges appearing on the screen are active charges and RESP should be coded HI.
- IN stands for information and is to be recorded when the requested information results in a negative reply. For example, when a Driver's License check shows that everything is in order.
- CONS - In a series of events, consequences is defined as the final result of the interaction. It is used, as such, as a seriousness measure. If, for example, a vehicle is stopped, the car impounded and the driver arrested, the arrest would be recorded.
- NO - None
IN - Inform/Refer
WA - Warn
ST - Stop Vehicle/Person
AR - Arrest
IM - Impound
MO - Mobilize
PU - Pursue
SU - Surveillance
RE - Report
TI - Ticket
- M/IN - The event was/was not MRDS initiated
R - MRDS Related (Officer used MRDS and the response was a HIT)
N - Not MRDS Related (Officer used MRDS to supplement information -event in progress-)
- END TIME - 24 Hour Clock
Time Observation Period Ends
- Coffee/Lunch Breaks
- Out of Unit Periods
- End of Shift

