Michigan Emergency Patrol, a Major Motorist Communications Project That Uses CB Radio

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The use of citizens band (CB) radios by the motoring public has increased substantially in recent months. Two previously reported programs demonstrated that CB could be used to fulfill many of the legitimate communications and real-time information needs of the traveling public. An intensive CB monitoring program in a major urban area, the Michigan Emergency Patrol, has handled more than 400 000 calls in the past 5 years. The wealth of experience gained from this program provides useful insights for those planning similar programs elsewhere. A recently established rural-area CB monitoring program being conducted by a state police agency has enjoyed a tremendous public relations success with all segments of the driving public and should encourage other states to implement similar wide-area programs. Based on the experiences of these four programs, a number of recommendations can be made for future system design.

The creation of the citizens radio service (CRS) and especially the allocation of certain radio frequencies in the 27-MHz band to class D of the CRS [commonly known as citizens band (CB) radio] have resulted in the installation of communications transceivers in many vehicles operated by the general motoring public. The potential for using such facilities for motorist assistance and highway emergency communications has been recognized in the formation of hundreds of volunteer groups of CB licensees, many of whom are affiliated with such national organizations as Radio Emergency Associated Citizens Teams (REACT) and Affiliated League of Emergency Radio Teams (ALERT). Most of these groups participate in and coordinate local efforts to monitor national CB emergency channel 9 (27.065 MHz) to relay reports of highway emergencies from the motoring public to the proper local authorities and to give general informational assistance to that public. The evolution of these coordinated monitoring efforts and some proposals for enhancing such activities have been the subject of papers previously published by the Highway Research Board, now the Transportation Research Board (1, 2, 3).

Within the past 2 years, the use and popularity of CB radio have increased substantially. CB manufacturers have not kept up with consumer demands for these transceivers. The Federal Communications Commission (FCC) has experienced a dramatic increase in the number of CB license applications, from a monthly average of about 30 000 in late 1974 (already double that of 1972) to more than 500 000 in early 1976. Two general reasons can be cited for this recent increase in CB licensing and usage. First, the motoring public has come to recognize the considerable value of such a mobile, two-way voice telecommunication resource, especially for communicating with other motorists and public safety authorities directly or through cooperative citizens' monitoring stations. Even the occasional abuse of this resource has not seriously detracted from the enthusiasm expressed by many public safety agencies for the increased capability of communicating with the general public that CB radio provides (4, 5). Second, the FCC has taken certain actions (to reduce CB licensing fees, liberalize and simplify operating regulations, and increase enforcement efforts against violators and unlicensed operators) that have increased the popularity of CB and its proper use.

The net effect of this increased CB radio usage has been to create a capability for a motorists' aid and communications system. Numerous authors have established the legitimacy and necessity for just such a system and have decried the lack of a national program to accomplish this goal (6, 7, 8). In an internal report, the U.S. Department of Transportation also recognizes both the need for such an aid and communications system and the possibility that CB radio can fulfill that need to at least a limited extent (9).

SUMMARY OF TWO PREVIOUSLY REPORTED PROGRAMS

Two programs that use CB radio have been previously discussed in papers presented to the Highway Research Board, and are summarized below.

Ohio REACT Program

The Ohio REACT program was established in 1970 to determine the potential of a voluntary citizens' monitoring program to meet the motoring public's emergency and assistance communications requirements on a statewide

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basis (3, 10). A special attempt was made to recruit and train volunteers for this program, to develop good working relationships with local public safety authorities, and to collect information on program activities as a guideline for the implementation of similar programs elsewhere.

In a more detailed statistical evaluation (11, 12), four call-profile trends of communications logged by the Ohio REACT program were noted.

1. Calls regarding reports of accidents constituted the largest category. However, the growth rate for such calls was below that of other types.
2. Calls regarding stalled vehicles constituted the second largest category. The growth rate of this category was average for the overall system growth.
3. Calls containing requests for information constituted the third largest category. This growth rate also was typical for the overall system.
4. After the first 3 months of operation, the total number of calls failed to follow a consistent growth pattern. This was probably due to a lack of expansion in the coverage hours or service area of operation.

The original sources (3, 10) are substantially more detailed than the discussion presented here and contain valuable information pertaining to hours of coverage, hours of calls reported, and participation by the individual volunteer teams.

The Ohio REACT program, despite considerable dedication from some of its participant teams, demonstrated that a geographically and temporally comprehensive monitoring program could not be developed and maintained on a statewide basis by relying solely on citizen volunteers operating from their own homes. Individual team participation was somewhat irregular, the variation in numbers of calls received by the different teams was substantial, and coverage of the state's extensive rural areas was spotty at best (12). What the Ohio REACT program did establish, however, was that a close and favorable working relationship between citizen volunteer monitors and public safety authorities could be developed, despite certain previous negative experiences of those authorities with the vigilant type of CB organizations.

After termination of the Ohio REACT program in 1972, the individual Ohio State Highway Patrol (SHP) posts were equipped with CB transceivers for monitoring CB emergency channel 9. More recently, the individual patrol vehicles of the Ohio SHP have begun to be equipped with such transceivers as well. The intent of these efforts has been to provide a greater coverage in Ohio's rural areas, especially those near Interstate highways and other primary routes. Data on these Ohio SHP and later urban-oriented REACT efforts are not currently available.

Detroit KUY Program

The Department of Streets and Traffic of Detroit, Michigan, established a CB monitoring program in 1966 to determine the utility of CB in collecting information of interest to that government agency (13). This program became known as the KUY program, after the call sign of the original, specially licensed system (KUY 3173).

CB transceivers were installed in the personal vehicles of a number of city government and private industry employees, as well as in some official city government vehicles. The persons using these mobile units, most of whom had not previously been familiar with CB radio, were instructed in the proper operation of CB units and were requested to contact the KUY base station only to report situations involving emergencies or unusual conditions that impaired safe and efficient traffic flow. This communications system was not intended for normal dispatch and business operations, nor was it originally intended to serve as a general motorists' communications facility. Although the program did not solicit participation by the general CB motoring public, that public had become the primary users of the system within 6 months.

In a more detailed statistical evaluation (11, 12), three call-profile trends were noted.

1. Calls regarding stalled vehicles constituted the largest single category for the first 2 years but then declined during the remaining 3.5 years of program operations.
2. Calls requesting information constituted the second largest category for the first 2 years but then surpassed stalled vehicle reports and soon accounted for about half of all calls handled.
3. Calls pertaining to accident reports constituted the third largest category.

Additional information is available on the disposition of calls from the KUY dispatcher to the Detroit police department, on the awareness of the Detroit CB licensee public about the KUY program, on the theoretical savings in detection time of major freeway incidents by use of the KUY system, and on the social and cost-effectiveness implications of the system (14).

The fundamental orientation of the KUY program was to serve as an information collecting system for the various functions (police, fire, road repair, and the like) of the city of Detroit. Therefore, some types of basic motorist aid communications (for instance, requests for service trucks for disabled vehicles not actually blocking a traveled portion of a roadway) were discouraged or just not handled. The KUY network (including remote receivers and transmitters, when fully operational) was intended to cover only the immediate Detroit freeway system. In reality, that network suffered from a lack of adequate coverage on certain Detroit freeways, a very poor coverage on Detroit's nonfreeway streets, and a total lack of coverage on freeways in the metropolitan area outside the immediate Detroit city limits. The remote transceivers became subject to increasing failure toward the end of the KUY program, and the hours of operation became quite irregular.

The tremendous public success of the KUY program ironically was also partially to blame for its failure. The user public had come to expect a considerable operational regularity and dependability and a responsiveness to a wide range of their legitimate communication needs. When those expectations grew beyond the capabilities of the program, an alternative program, the Michigan Emergency Patrol (MEP), was developed by members of that user public.

MICHIGAN EMERGENCY PATROL

MEP was formed in 1967 by citizen volunteers to supplement the operation of the KUY program. In late 1970, MEP moved to a central office and transceiver facility atop one of Detroit's tallest buildings. From there, a monitoring coverage superior both in range and in saturation to that of KUY's multiple-remote system was attained. MEP's immediate expansion in number of calls over that handled by KUY was due to this superior location and to a willingness to respond to a wider range of motorists' communication needs. In addition, MEP's association with several area commercial radio stations resulted in a network for the rapid dissemination of road and traffic information to the general driving public.

Statistical Trends

In a more detailed statistical evaluation (11, 12), eight call-profile and operations trends have been noted for MEP.

1. The volume of calls in all categories has been larger (in most instances considerably larger) than in the respective categories of either the Ohio REACT or KUY programs.
2. Calls requesting information have constituted the largest single category. The percentage of these calls has demonstrated slight seasonal fluctuations, increasing in late winter and spring. Operational problems have arisen from the large number of these information-request calls.
3. Calls providing general information (reports on traffic, weather, and road conditions) to the MEP base constitute the second largest category. No consistent seasonal trends have been noted.
4. Calls reporting stalled vehicles have constituted the third largest category. There has been a slight increase in the number of these calls during the winter months.
5. Calls pertaining to accident reports have constituted the fourth largest category; no seasonal trends have been found.
6. The percentage of improper requests (as defined by FCC regulations) grew initially but then tapered to zero. Unidentified and deliberately interfering transmissions (dead carriers, whistling, music, and the like) have not been logged.
7. The month-to-month regularity of system growth and development (or user familiarization with services rendered) had begun to stabilize by early 1974. The tremendous growth in popularity of CB, which began in mid 1974 and continues now, has upset that stability somewhat, however.
8. Ambient-weather and day-of-week factors have had a significant impact on call profiles. A particularly notable increase in information requests coincided with every heavy snowstorm that occurred during a nonholiday workweek. These weather factors also increased the total number of calls handled.

A wealth of additional information is available about the specific nature of the calls, their time of day and day of week, the identity and location of the callers, and ambient-weather and traffic conditions.

Problems Encountered

Like the Ohio REACT and KUY programs, MEP has encountered six problems that should be expected to beset any intensive CB monitoring project. First and foremost, ambient radio frequency noise and adjacent-channel "bleedover" difficulties are exacerbated by MEP's relatively high antennas and urban location. Receiver redesign and use of special audio filters are being investigated as possible cures.

Second, and related to the first item, the discrepancy between "talk-out" range (base to mobile unit) and "talk-back" range (mobile unit to base), the former invariably being greater, is being countered by the planned installation of additional remote receivers. Although this would seem to follow the example set by the predecessor KUY program, the receivers will be located much further out in the tricounty metropolitan area and will be of the improved design just mentioned.

Third, recurrent but unintentional cochannel interference from distant base stations whose transmissions can easily overwhelm those of much closer mobile units is being countered by careful receiver antenna installation and orientation for directional (nulling) effects. Similar interference from closer in stations has not developed.

Fourth, deliberate interference is occasionally encountered. This type of interference is probably caused by malcontents who view MEP as an authority figure because of its close interaction with the public safety authorities and its insistence on callers' strict adherence to FCC operating regulations, or by the inevitable misfits who delight in causing hardship and grief. Fortunately, the general CB user community sees such a benefit deriving from the MEP program that considerable peer pressure can be brought against those responsible for this misconduct.

Fifth, the high level of training and commitment required of the MEP base operators has created a high personnel turnover and has hampered recruitment. The 30 to 35 person-h/weekday, or 200 to 225 person-h/week, logged at the MEP base are split disproportionately among the 30 most active and 60 less active MEP members; the average member contributes 4 to 6 h/week of operating time.

Sixth, the large volume of radio traffic being handled on channel 9 by MEP is causing increasing frequency congestion especially during the morning and afternoon rush hours. So many callers are at times trying to reach MEP that the more distant mobile units, including those with urgent traffic, cannot get through. Over short periods of time (3 to 4 min), calls are handled as frequently as 3 to 5/min. More than 60 calls/h and 600 calls/day have been received on occasion. Sometimes six or more callers wait after having been acknowledged and asked to stand by to allow completion of earlier or more urgent communications.

To combat this overcrowding, MEP has implemented five programs over the last 4 years.

1. Callers at other base stations have been asked to use the telephone instead of the CB system. This program was extended beyond the rush-hour periods and is now followed by most callers around the clock.
2. During those rush hours with inclement weather, callers have been asked to refrain from placing any calls not pertaining to immediate emergencies, even though such calls are permitted by FCC regulations. These requests have generally been honored by a user public not otherwise known for such restraint.
3. The issuance of traffic advisories to subscribing commercial radio stations has been expanded. (Each advisory currently goes to six stations.) In 1975, more than 14 500 such advisories were issued, probably more than three-fourths during the weekday morning or evening rush hours, or an average of one for every 6 min (as needed to convey information on new reports or to modify old reports).
4. Requests for information on road, traffic, and weather conditions ("10-13s") have been answered, but the callers have been asked to telephone the MEP base before starting the trip next time. Special telephone lines have been installed along with automatic answering and message delivery equipment. During 1975, half again as many of these 10-13s were actually handled by MEP as were logged on the air (50 000) because of the use of this phone system.
5. In response to 10-13 requests, MEP operators have occasionally summarized briefly the conditions on all major routes within the tricounty metropolitan area. Potential callers and callers on the line have been saved time by this process. As many as six previously unrecognized callers have been heard to acknowledge receipt of such a single summary, and then to sign off.

Many drivers regularly traveling through the Detroit area are known to monitor channel 9 continuously, especially when they are out of range of their home or office base stations, just to keep abreast of developing traffic situations.

Since early 1975, both the number and percentage of 10-13s have again increased. This is felt by experienced MEP staff to reflect the growing popularity of CB radio usage among the general public and thus the presence of many new callers who may not be initially familiar with MEP's preferred operating style. In addition, 1975 saw a general increase in driver confusion and traffic congestion that resulted from detours around Detroit's most comprehensive expressway repair and reconstruction program in years.

MEP Program Summary

The MEP program has demonstrated that a comprehensive CB motorist aid system can succeed in a major metropolitan area and that the citizen users of such a service will respond intelligently to the problems that inevitably arise.

MEP is basically a bidirectional information processing system. To collect information, one needs input from the metropolitan area CB motoring public. Such incoming information calls now constitute about one-sixth of all calls handled and are MEP's lifeline to the real and changing world. However, for that public to be willing to give such information, something must be available in return—an overview of the cumulation of these reports.

Some of these 10-13 requests may be merely radio checks, which are highly undesirable on an emergency channel and are prohibited by FCC regulations. Although these must be minimized, banning all 10-13s would disallow something that indeed reflects a legitimate communications need. To implement other means to perform this information distribution function (alternative CB channels, commercial broadcast radio, telephone recordings, changeable message signs, the new travelers information service radio system adjacent to the AM broadcast band) would be preferable.

The MEP program has been extended beyond what would seem reasonable for a strictly volunteer effort. A more accurate description is that MEP is considered by the user public, the local public safety authorities, and the subscribing commercial broadcast media as a professional organization that happens not to pay its staff. Similar projects elsewhere that have attempted to emulate the MEP program have not succeeded. They have lacked a general appreciation of the importance of a substantial and committed administrative structure. MEP enjoys such a supporting group, representative of a broad range of capabilities and community interests. Indeed, some of its members had little previous experience with CB radio and rarely operate the MEP base station but nevertheless contribute invaluable services and administrative expertise to the organization.

Although mindful of the burden of present commitments, MEP is undertaking an ambitious expansion project. After more detailed evaluations of operator-loading and other personnel problems and of multiple-site frequency congestion problems and after discussion with the FCC regarding special licensing for remote transmitting facilities, extension of the current coverage into nearby communities is anticipated. The long-term goal is a coordinated, central office operating facility serving the southeastern quarter of Michigan's lower peninsula.

MISSOURI STATE HIGHWAY PATROL CB PROGRAM

The Missouri State Highway Patrol has recently implemented a program that deserves a brief mention here. The Missouri SHP has equipped its posts and patrol vehicles with CB radios capable of simultaneously monitoring national CB emergency channel 9 and one other (selectable) channel. The thrust of this effort has been toward vehicular installations because Missouri has relatively few SHP posts statewide and must rely on patrol vehicle usage of CB to achieve the desired coverage.

Although the Missouri program has been fully operational only since August 1975, their comprehensive statistical logging has provided some valuable insights into the operation and evolution of the project. From logging information distributed by the Missouri SHP, four trends are noted.

1. Within the first 6 months of operations, calls containing requests for information or directions have more than tripled in number and doubled in percentage of total calls received. This is the largest of all individual call categories now, although it has begun to subside somewhat.
2. Stalled and disabled vehicle reports constitute the second most common type of call, averaging about one-fifth of all calls.
3. Reports of dangerous driving behavior (wrong-way driving, driving while impaired, speeding) are the third most frequent type of call, averaging about one-seventh of all calls. This category reflects an emphasis in the Missouri program on collecting information from the motoring public concerning observed driving violations.
4. A substantial monthly fluctuation in total number of calls received exists and possibly is attributable to ambient weather variations.

Additional information is available from the Missouri program reports including information on type of roadway (Interstate versus non-Interstate), type of violation and action taken, and whether the reported incident was located.

Two long-term problems with the Missouri program can be anticipated, although neither has yet become serious. First, a conflict may develop between the type of service that the CB motoring public may come to desire and the type that the Missouri SHP is willing and able to provide. The program could become bogged down by an excessive number of requests for information, directions, or nonemergency message transfers. Although these are not unreasonable requests for a comprehensive motorist communications system, they should be directed instead to local citizen volunteers on nonemergency channels. Furthermore, the CB motoring public will have to recognize that immediate Missouri SHP response to all reports of potential or even existent emergencies may not always be possible because of more urgent incidents elsewhere or the unavailability or inopportune location of personnel. Second, even the equipping of all Missouri SHP vehicles with CB radios cannot provide 100 percent monitoring coverage. The active involvement of citizen volunteers (and the relatively greater monitoring coverage provided by their base station antennas) will be necessary and desirable.

The Missouri SHP justifiably considers its CB program to be a tremendous success. Its public relations value alone has had a substantial positive impact on that state's driving public—both the local citizenry and transients. The comprehensive documentation of the operations of this program will provide a wealth of information on its cost effectiveness (time and lives saved, for

Table 1. Summary of logging reports for the four programs.

Program	Emergencies		Incoming Information	Information Requests	Miscellaneous
	Existing	Potential			
Ohio REACT	27.0	38.1	6.9	17.0	15.3
Detroit KUY	14.9	33.3	—	46.4	5.4
Detroit MEP	7.6	12.9	16.8	55.0	7.6
Missouri SHP	13.7	40.9	5.4	31.4	8.7

Note: Values are average monthly percentages of calls in busiest semiannual period for each program.

instance). Many other states are considering shifting budgetary priorities or soliciting state or federal financial support to create similar programs and are closely following and will benefit from the experience of the Missouri SHP program.

COMPARISON OF THE FOUR PROGRAMS

Radio communications between the general public and the agencies or groups that conduct each of the four CB monitoring programs have usually been initiated by the public. Therefore, the respective user public's image or perception of the utility and purpose of each of the programs is reflected in the relative distribution of calls logged in each of the various categories, the call profile.

A CB motorist communications system can be of most obvious and valuable benefit in reporting highway emergencies such as accidents to which the public safety authorities must immediately respond. Each of the four monitoring programs described previously has given highest priority to such emergency calls. However, as long as all those emergencies that could have been reported were reported as expeditiously as possible, the nature and extent of the nonemergency traffic handled are more indicative of the public's conception of the image or utility of the respective monitoring program.

For this reason, and to simplify comparison of the four programs, representative logging data from each are given in Table 1 in five summary categories. The average number of monthly calls based on busiest semiannual period for each program is as follows:

Program	Number	Program	Number
Ohio REACT	1216	Detroit MEP	8276
Detroit KUY	952	Missouri SHP	9101

The existing emergencies category includes all reports of accidents, fires, medical emergencies, and other conditions purporting to need an immediate response from the appropriate public safety authorities. The potential emergencies category includes all reports of disabled or abandoned vehicles, debris, malfunctioning traffic control devices, dangerous driving, and other conditions that need subsequent attention from some public safety authority or service or might result in some situation in the existing emergencies category if not corrected. (Because disabled vehicles on the roadside are a distinct traffic hazard, requests for service or assistance for such is included here.) The incoming information category includes all other reports that are relayed to the public safety authorities or are of interest to the general motoring public. The information requests category includes all requests for information (as distinct from service or physical assistance), such as those on traffic conditions, directions, and the like. The miscellaneous category includes all contacts not clearly falling within one of the other categories.

In the original data sources, much more detailed breakdowns of these summary categories are available. Readers are cautioned to distinguish between reference to the individual categories mentioned previously in this paper and subsequent reference to the five summary categories.

The busiest semiannual periods for the four programs, on which the information given in Table 1 is based, were August through September 1975 for the Missouri SHP program and the last complete periods for the Ohio REACT and MEP programs. The last period was not the busiest for the KUY program because MEP had already captured most of its calls.

For the KUY program, the busiest semiannual period was also the most stable (in terms of month-to-month variations in total number of calls) before MEP operations started. For MEP, the last and busiest period was not the most stable because of the increasing number of new users. For the Ohio REACT program, system growth had stabilized and even declined; however, evaluation of the long-term monthly deviations is not possible because of insufficient data. The Missouri SHP program is too young for a meaningful analysis of monthly variations.

Of all calls handled by the Ohio REACT program, the data given in Table 1 show that almost two-thirds pertained to existing or potential emergencies. This program had the apparent image of serving primarily as an emergency communications system. Yet, the total number of calls logged indicated that, for a statewide system, it was not an efficient large-scale means of reporting highway problems. A primary factor in this inefficiency was the somewhat haphazard nature of monitoring coverage that is inherent in such a volunteer system. Also, these data come from early 1972, long before the current explosion of CB popularity; user density (both mobile units of the general public and monitoring base stations) was much lower than would be found today.

The Ohio REACT program image is thought to be rather typical for REACT type of operations (volunteer home monitoring) elsewhere. (In the Ohio REACT program, unlike in the others discussed here, the call categories employed were not mutually exclusive. A particular call could have been credited to several appropriate categories. Therefore, the sum of percentages in Table 1 is greater than 100.)

The KUY program, designed as an information collection resource for the government agencies of the city of Detroit, nevertheless developed an image of being able to provide information to the CB motoring public. The data given in Table 1 show that about half of all calls pertained to existing or potential emergencies but that about another half were information requests. No logging category was apparently felt to be needed for general (nonemergency) incoming information. Compared with that of its successor (MEP), the public image of KUY was still substantially more identified with serving the motoring public's emergency communications needs.

The emergency reports handled by the MEP program have always been greater in number but smaller in percentage of total calls than those handled by KUY during its busiest periods. Some of this can be attributed to the somewhat larger service area of MEP. In the last 5 years, the number of MEP emergency reports has increased at a rate only about one-fourth as great as the increase in nonemergency calls. Such emergency reports now constitute about one-fifth of all traffic handled. However, this does not mean that MEP is derelict in its attention to emergency traffic. Rather, it indicates that very few major freeway incidents or hazardous conditions escape their attention. (The number of reports cannot exceed the number of incidents because subsequent reports of the same condition are logged instead as incoming information.) A greater image of information re-

source is undoubtedly attributed to MEP by its user public, and a greater effort is made to keep that information current than is found with other CB monitoring programs.

The Missouri SHP program exists in a different user environment altogether. In Detroit, extensive monitoring of channel 9 is done by the transient driving population. In Missouri, undoubtedly the bulk of CB users are usually monitoring and frequently conversing on other channels, switching to channel 9 to summon help or report hazards or violations. The program monitors have dual-channel, simultaneous-monitoring capabilities, and presumably do listen to and probably occasionally engage in informal communications on other channels. (MEP operates only on channel 9.)

In Missouri, an extensive amount of information on road conditions would be available directly from other motorists. In all likelihood, the CB motoring public would become more dependent on the Missouri SHP for road information primarily during times of inclement weather, when other road users normally having that information are less numerous, less available (more preoccupied by driving tasks), or less likely to have traveled from as far away.

In additional, informal comparisons of the MEP program with current volunteer efforts in other major urban areas, the considerable benefit of coordinating or collocating all monitoring from a single office has been observed. A multiplicity of uncoordinated monitoring efforts, even though technically easier to accomplish because centralized advantageous transceiver locations or remote operations can be avoided, is wasteful of volunteer personnel and has led to other operational difficulties exacerbated by the inevitable petty jealousies between the competing volunteer organizations. In concentrated urban areas, no reasonable alternative to a central monitoring point is envisioned if efficient operations are to be accomplished.

In summary, in the three programs discussed in this paper that have more than a year's experience apiece, a greater percentage of all calls concerned nonemergency reports or requests as users became more familiar with the potentials of the communications service provided by the monitoring agencies or groups. Although the number of reports of accidents and other existing or potential emergencies rose (except in Ohio), this increase was not as large as overall system growth. The same pattern would be expected to develop in Missouri as well, although this program seems determined to avoid the saturation and distraction problems encountered by MEP.

CONCLUSIONS

Citizens band radio offers a here-and-now capability that, despite its limitations, can serve to partially fulfill the legitimate communications and information needs of the traveling public. The recent phenomenal growth in CB usage and popularity has created a broader base for participation by the traveling public and ensures that its use for highway safety will be with us for some time to come.

Use of CB for communications pertaining to transportation safety and other aspects of motorists' real-time information and assistance needs will be shaped in part by the image of the services rendered and the groups or agencies providing such services. In an urban environment, the MEP and KUY programs have demonstrated that such services can and should extend beyond a mere capability of relaying reports of highway emergencies to the appropriate public safety agencies for their response. Furthermore, the demands placed on such an urban communications program can be expected to vary with such factors as time of day, day of week, month of year, weather, and road obstacles and detours.

A motorists' communications system built on a strictly volunteer structure will be prone to certain variations in hours of service and range of coverage. On the other hand, a governmentally sponsored service without a substantial institutional commitment to its successful operation, or with a narrowly defined and self-serving goal, may not fare much better.

Despite certain common impressions regarding CB radio, self-restraint and a certain degree of self-policing (peer pressure) from within the CB user community can probably be expected, but only if the benefits to be derived are readily immediate and obvious to that user group. The cooperative suppression of 10-13 calls to MEP during times of high vehicular density and inclement weather (when presumably such information on road conditions would be of greatest use to the motoring public) in deference to more urgent communications supports this observation.

A continuing two-way flow of information on road and traffic conditions is desirable. Information is necessary not only about the initial occurrence of some accident or blockage but also about its continuing and changing existence and subsequent removal. In a comprehensive urban communications system, demands and priorities may dictate that the redistribution of such information should be accomplished by means other than national CB emergency channel 9. For instance, it should be accomplished on other channels or by the commercial broadcast media. In addition, use of such media provides an access to a larger driving public than that which could be reached if only CB were used.

Motivations for system use are important. Certain inherent rewards exist for participation in such a communications network. The "first-person" benefits, namely those in which the caller is directly involved in the incident (accident, breakdown, traffic tie-up, and the like), are direct and tangible, such as in time saved in securing an ambulance or tow truck. However, there are also "second-person" benefits, such as a person's natural gratification in hearing his or her own report of an incident being relayed to others on CB or especially on commercial broadcast radio. Even completely without external reinforcements, good samaritan motivations are not uncommon.

The MEP and Ohio REACT programs demonstrate that the problems of interfacing volunteer efforts with existing safety agencies, of getting legitimate acceptance by and recognition from such agencies, are resolvable. Although these problems are beyond the scope of this paper, it is noteworthy that many observers of the CB radio and public safety communities consider them to be the most difficult for volunteer CB monitoring programs.

The public relations value of direct public-safety-agency involvement in a CB monitoring and communications program has been amply demonstrated by the success of and citizen response to the Missouri SHP program.

RECOMMENDATIONS

Pending the creation of a dedicated or a more comprehensive motorists' communications radio service by the FCC, certain procedures can be recommended for those groups or agencies considering establishing CB monitoring programs.

New systems should especially emphasize rural coverage because, in those areas, the fewest alternative communications resources (telephones, passers-by, etc.) currently exist and the death and injury rates from highway accidents are highest.

Those systems designed to serve populous urban areas

should attempt to use a separate CB channel for the more routine motorist communications functions (10-13s and other nonemergency reports and requests). In some major metropolitan areas, perhaps several channels may need to be used for these and other functions. (The FCC is currently considering a proposal to allocate additional channels to CB radio for class D operation.)

Greater encouragement should be given to the use of simultaneously monitoring multiple-channel receivers, especially by those public safety agencies that permit or encourage their employees to use CB for communications directly with the general public from agency-owned vehicles. This would enable a continuous watch on national CB emergency channel 9 regardless of whatever other channel was being monitored by those employees.

Careful consideration should be given to the desired system image, and to the services that would or would not be provided by the respective agency or group. If time and resources permit, the continual updating of information on highway incidents by subsequent or on-scene observers and the dissemination of any pertinent advisories to the motoring public via CB, commercial broadcast radio, and other means are recommended. Some continuing effort at public education and familiarization with this system image should be anticipated.

The potentials for volunteer contributions (personnel, experience, and even hardware resources) should be recognized. Especially the spontaneity and enthusiasm of community-service-minded volunteers should be combined with the professionalism, discipline, and administrative stability of current public safety operations. The resulting CB communications system should have both a public involvement and accountability and a substantial institutional commitment to success. Furthermore, other community resources, such as the print and broadcast media, should be used.

In those communities where the establishment of a comprehensive CB communications system is undertaken by citizen volunteers without the active involvement and financial support of the local public safety community, particular care must be given to such administrative details as fund-raising and coordination of services, personnel, and other resources. The record of accomplishment of such independent efforts is not good especially because of an overabundance of enthusiasm hampered by an inadequacy of patience and administrative and organizing talents.

Creation of new programs should be accompanied by a careful analysis of the needs of the CB user public to be served. For instance, the availability of alternative routes and the proportion of transient drivers who are not likely to be familiar with them need to be determined.

Care must also be taken not to encourage the development or perpetuation of cliquish or "toy cop" groups. Participation by the public (reporting highway incidents, requesting service vehicles, and the like) must be completely open to all regardless of group affiliation or area of residence. System operations should not prerequire knowledge of specialized codes or ciphers. Burgeoning CB popularity means that a large number of novices will exist whose familiarity even with the time-worn "10-codes" may be minimal and for whom the example of clear and simple language should be a welcome relief from the affected mannerisms too often encountered on the other, nonemergency channels.

The designers of subsequent comprehensive systems are encouraged to consider a cellular type of coverage similar to that proposed for the new 900-MHz land-mobile networks. The larger the individual exclusive operating cells become, the larger the areas without service would be when hardware components fail or interference is encountered. Conversely, the smaller the individual operating cells can be made, the greater is the chance that communications could be accomplished even in the presence of such interference. If multiple or redundant coverage zones are used (this would be desirable), then real-time central office coordinating of their coverages would be essential.

Subsequent regulatory changes to CB radio should be undertaken with input both from transportation specialists familiar with the legitimate real-time information and communications needs of the traveling public and from communications specialists familiar with hardware and system design, radio frequency spectrum performance and allocation, and current CB user behavior.

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