ODIS VS. CUE:
A LOOK AT DIME FILE MAINTENANCE

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INTRODUCTION

On behalf of the City of Omaha, I would like to thank both the American Congress on Surveying and Mapping and the Census Bureau for inviting us to participate in this symposium. I especially would like to thank the Census Bureau for their courage and foresightedness in creating the DIME Geographic Base File System which has provided cities, such as Omaha, with a much needed geographic tool by which new data processing technology can be locally applied to solve urban problems. DIME, without question, has become an important breakthrough in the development of local geographic information systems throughout the United States.

Although the development of DIME and its associated technology is a good beginning, it can and must be continually refined with additional sophistication being built into the system. This will enable it to become "institutionalized" as one of the primary tools that planners, researchers, and decision makers can rely upon to provide the right answers to the many questions and problems that face American cities. Toward this end, DIME must be implemented as an ongoing program within every SMSA in the United States. For this to become a reality, the principle problem with DIME, that of maintenance, must be resolved. In Omaha, we have locally designed and initiated an on-line DIME implementation system named ODIS (On-line DIME Implementation System) as a partial solution to the problem of DIME file maintenance. ODIS has allowed DIME maintenance to become a very simple and efficient operation and has helped refine DIME technology into a more usable product for local government.

In Omaha, as early as 1968, we recognized the potential of DIME technology and thus began our involvement with the Address Coding Guide Program, which eventually evolved into the DIME System. Between 1968 and late 1974, the DIME Program in the Omaha area had been beset by many problems and delays which more than once had almost terminated the program. But in 1974, a number of critical decisions were made which led to the creation of ODIS. This afternoon, in describing ODIS, I would like to first discuss the system's evolution; secondly, analyze the mechanics of the ODIS Program in comparison to it companion batch system CUE; and finally conclude with a few observations about national DIME file policy as viewed from local government.

THE EVOLUTION OF ODIS

To understand the operation of ODIS, an explanation of both Omaha's data processing environment and the development of the ACG-DIME System is required, because ODIS is a by-product of a highly successful data processing system from local government and the frustrations of local agencies to implement the DIME system in Omaha between 1968 and 1974.

Omaha is the central city of the Omaha-Council Bluffs SMSA containing over 65% of the SMSA's one-half million population. The SMSA is made up of three counties in two states, Douglas and Sarpy Counties in Nebraska and Pottawattamie County in Iowa. The data processing structure for local government within the SMSA is fairly simple. Douglas County is the only county within the SMSA with its own computer installation, and the City of Omaha is the only city within the SMSA that now participates with Douglas County in the use of that facility.

DOUGLAS COUNTY SYSTEMS AND DATA PROCESSING CENTER[1]

The Douglas County Systems and Data Processing Center (DCSDP) is a cooperative city-county venture serving the needs of both jurisdictions (the City of Omaha and Douglas County). The center was first established in 1967 for the purposes of:

1. Developing a computer center offering the latest technology to departments in batch and teleprocessing modes;
2. Organizing a professional staff offering systems and programming capabilities to maximize computer usage;
3. Encouraging the concept of sharing common data bases with each county and city department, adding to and retrieving from data based at the computer center.

DCSDP is an IBM shop containing two computers: an IBM System 370, Model 155 with 2,000K available memory, and an IBM System 360, Model 40 with 256K available memory. The shop also contains 12 tape drives and a disk storage system consisting of 24 IBM 2314 disk spindles and 10 IBM 3330 disk spindles. The center operates under OS/MFT. DCSDP has a fulltime staff of over 80 and operates 24 hours a day, 365 days a year. Financing of the data processing system has been accomplished through approximately 95% local county, or city funding. The annual budget of the center is $1,800,000 and is paid for by 40 governmental departments and user agencies within Douglas County.

One of the major functions of the center has been teleprocessing inquiry begun in 1969. Today the teleprocessing network of DCSDP consists of over 125 remote CRT and typewriter terminals, answering between 20,000 and 25,000 daily user inquiries. The principle teleprocessing applications maintained by the center include:

1. Douglas County Real Property System, (Ownership, assessment, tax and permit information are available by owner's name, legal description, property address and account number.)
2. Criminal Justice System, (Municipal, District Courts, and Police records are available by name, ticket and warrant number, address, driver's license and record bureau number.)

3. Douglas County Auto Title/Registration/Tax File System, (Automobile records are available by owner, license, title and registration number.)

4. Douglas County Governmental Accounting System, (Inventory and purchase orders are available.)

5. Douglas County Hospital System, (Admissions, laboratory, and accounting records are available.)

6. Omaha Street Inventory System, (Street characteristics/conditions, traffic accidents and volumes are available.)

7. Omaha Sanitation Inventory System, (Sewer location, type, condition, and sewer plant maintenance data are available.)

8. Industrial Wastewater Sampling System, (Industrial water quality condition data are available.)

9. Public Works Cost Accounting System, (Manpower and machinery accounting are available.)

10. Structural Condition and Content System, (A classification system of commercial and industrial buildings maintained by the Omaha Fire Division.)

In addition to the above teleprocessing systems, DCSDP maintains a large number of data files and software for city-county departments and agencies. The center is a recognized census summary tape shop, and maintains a majority of the 1970 census summary tapes for the SMSA. DCSDP also maintains a library of statistical/engineering programs, computer mapping packages (SYMAP, SYMVU, SAMPS, GRIDS, and C-MAP are among the mapping programs available. The center also operates a 30-inch Calcomp drum plotter.), and two powerful software systems; IBM's Information Management System (IMS) and Informatics Mark IV File Management Systems, in addition to the traditional data processing languages (COBOL, ASSEMBLER, BAL, FORTRAN). This user oriented software has provided important tools for data management for city-county government.

The Douglas County Systems and Data Processing Center has been described in some detail because it is one of the major reasons why it was possible to develop ODIS in Omaha, for without the necessary data processing technology available at DCSDP, the system could not have been created. The data processing environment in Omaha is fortunate to consist of only one computer installation for local government because this has allowed us to avoid the problems of competing computer centers with diverse hardware and software configurations. Additionally, the center has allowed governmental users to maximize the effectiveness of their data processing budgets through the consolidation of systems development and data requests. In recognition of the quality and efficiency of the Douglas County Systems and Data Processing Center, the National Association of Counties distinguished the center in 1973 with a County Achievement Award.

THE OMAHA ACG-DIME PROGRAM, 1968 to 1974

In 1967, the Metropolitan Area Planning Agency (MAPA) was established as the SMSA's regional planning agency. One of the first projects undertaken by the agency (under a HUD 701 Planning Grant), was the creation of the Address Coding Guide (ACG), for the urbanized portion of the Omaha-Council Bluffs SMSA in preparation for the mail-out/mail-back 1970 census. The ACG was created in the four months between

May and August, 1968. The work was conducted by three clerks using commercial directories of the metropolitan area as basic sources. The project required a total time of 1.37 man years to complete and expended over $7,000.00. Although the completed ACG reflected the accuracy or error inherent in the commercial directories and the subsequent coding, it nonetheless provided a 1967 address file for the urban SMSA. Upon completion of the ACG, the program was terminated and the clerical staff reassigned.

In 1970 (under another HUD 701 Planning Grant), MAPA participated in the Address Coding Guide Improvement Program. As part of this program, the Metropolitan Map Series (MMS) map sheets for the Omaha SMSA were corrected and updated to 1970, and DIME features added to the MMS and ACG. The Metropolitan map sheets for the Omaha area were created from the 1967 U.S. Geological Survey Quadrangle Maps and had never been adequately checked for accuracy. During the ACG Improvement Program, numerous conflicts with the local maps became apparent. Many of these conflicts were resolved and corrected in a large part by extensive field work, although many errors still remain that could not be corrected due to the project's time limitations. The map problems encountered during this program and more recently have demonstrated the absolute necessity for up-to-date local maps and aerial photos as a source for both address coding and MMS revision.

The addition of DIME features to the ACG created its own set of problems. Due to the time frame in which this work was to be accomplished (4 months), the ACG was assumed to be entirely correct, thus prior editing was not done and a determination of the accuracy of the 1967 ACG was not made. Additionally, it was found that close supervision of the coding staff was required, thus cutting down on the efficiency of the program. In spite of these problems and others the project was completed and the materials returned to the Census Bureau on August 3, 1970. The ACG Improvement Program involved a staff of six working for a total time of 1.46 man years (coding) and expended almost $17,000.00. The result of the program was a 1970 set of Metropolitan Maps with DIME features added and a DIME file which included the 1967 Address Coding Guide with the 1970 DIME features. With the completion of the ACG Improvement Program in 1970, as with the creation of the ACG in 1968, the program was terminated and the staff either laid off or assigned to other activities.

On July 10, 1972, almost two years after the completion of the ACG Improvement Program, MAPA received the digitized version of the ACG/DIME file. Shortly thereafter, a limited number of ADMATCH runs were made against the file from local data with fairly good results (we had an 84% match rate against the 1970 Douglas County Auto Registration File and an 86% match rate against the 1970 Housing File created by MAPA for the SMSA). As a result of this an other work with the file in 1972 and 1973, the file was estimated to have no more than 10% residual error in both the address and topological data; however, the coordinate information on the file was in considerably worse condition with approximately 25% of the coordinates in need of redigitizing.

Between the time DIME had been received in Omaha and late 1974, the program was nearly terminated for four basic reasons:

1. The unavailability of funding for DIME through Federal grant programs. HUD, who had previously funded the preceding two programs, suddenly refused to fund the DIME Program as part of MAPA's 701 Planning Grant.
2. The inability of MAPA to retain the technical staff assigned to the program, largely because of discontinuous funding and administrative problems.

3. The lack of broad based local governmental support for the program due to unfamiliarity with the technology and local applications, and the lack of confidence in the accuracy of the file.

4. The lack of an established maintenance program at the Federal level to correct and update the file (CUE was not implemented on a national level until 1973).

By the end of 1974, MAPA had expended well over $35,000.00 on the development of DIME from the initial creation of the ACG in 1968 and had a file that was in fair condition for 1970 analysis, but was badly in need of correction and update. At this point, the prospects for implementing DIME were very pessimistic. One of the only reasons the DIME program was kept alive in Omaha during this period was due to the loyalty and dedication to the program of a very small group of technical people who remained convinced if its overwhelming potential. This enthusiasm was helped in no small part by the Center for Census Use Studies' DIME Workshop Program.

As a result of this technical group's persistence, a number of critical decisions were made by local administrators in 1974 to locally create and fund a DIME Implementation Program.

The two most important decisions made during 1974 were in regard to:

1. The DIME maintenance methodology to be utilized in Omaha, and

2. Financing and staffing the DIME Maintenance Program.

The first decision made was to develop our own maintenance program locally. This decision came after an extensive review of the Census Bureau's Correction, Update and Extension (CUE) Program, implemented on a national level during 1973. We looked at the CUE Program in detail for its application to both Omaha's DIME file and data processing environment. As the result of this review, two major problems became apparent. First was the problem of the program's funding and administration. Based upon our previous experiences with DIME, it became obvious that a continuous level of funding was required for the CUE Program, both to employ an independent DIME staff and to pay for local data processing to keep continuity in the program. In 1974, direct funding for the CUE Program in Omaha, either locally or from the Federal Government, was impossible.

The second major problem with CUE was in regard to its batch-based correction and update system. In Omaha since 1969, we had been using on-line correction and update systems with very good results. They had proved to be far superior to batch systems for files requiring continuous maintenance such as DIME. By 1974, a high level of sophistication had been achieved in the development of teleprocessing systems by the Douglas County Systems Data Processing Center. Thus, it appeared obvious that the answer to DIME maintenance in Omaha was to utilize the teleprocessing system. This decision led to the creation and development of ODIS.

In 1974, a second decision was reached in regard to financing and staffing the DIME Maintenance Program. Once we had determined to develop our own maintenance program locally, we also had to finance and staff the program. Unlike the problem with CUE funding, which required money for both personnel and data processing, ODIS only required data processing funds to begin the program (ODIS was estimated to cost approximately $17,000 for the system's work and programming required to place DIME on-line). By broadening the base of the DIME Program to include the City of Omaha directly as well as MAPA, it was found that the necessary data processing funds were available on a 50% split. We discovered that it was much easier to obtain data processing funds rather than staff funds from Federal or local programs. By shifting

MAPA's funding approach for DIME from HUD funding to DOT Transportation Planning funds for data processing, MAPA was able to finance 50% of the system, the other 50% came from local funds earmarked for data processing from the Omaha Public Works Department. By August, 1974, MAPA and the City of Omaha had signed an agreement to create ODIS, and a staff (the ODIS Technical Committee) was also made available on a part-time basis from both organizations to begin the program.

ODIS developed in Omaha because of the availability of a sophisticated data processing environment and as the result of years of frustration in implementing the DIME Program. In Omaha, we became convinced that the only way a DIME maintenance system would be built, considering past experiences and local resources, would be if DIME was to become "institutionalized" as a basic reference tool for geographically based data required by local government. In order for this to be accomplished, DIME maintenance had to become inexpensive, fast and efficient. Additionally, all DIME maintenance would have to be handled locally with existing personnel. With the creation and development of ODIS, those goals have been accomplished.

ODIS - ON-LINE DIME IMPLEMENTATION SYSTEM

ODIS integrates the three DIME implementation procedures of correction, update, and extension into a unified program. In addition, ODIS allows for daily maintenance of DIME for update and error correction. ODIS does not totally abandon the Census Bureau's guidelines and procedures; on the contrary, we have been extremely careful to utilize Census Bureau standards and most of the technical procedures covering MMS revisions, interim block renumbering, node numbering, addressing, etc. The Census Bureau has done an excellent job in documenting these standards and procedures as part of the CUE Program. The only area involving basic disagreement between ODIS and CUE is that of the CUE edit and batch environment approach to DIME maintenance. Instead of using computer edits to first correct DIME for 1970 and then update it in a batch environment, we have integrated correction and update into one simple manual procedure, with the results transacted to the DIME file via our on-line system.

In explaining the mechanics of ODIS, three individual elements of the program shall be discussed:

1. ODIS Technical Committee
2. ODIS Geocoding
3. ODIS Teleprocessing

ODIS TECHNICAL COMMITTEE

When ODIS was created in 1974 and the involvement of local government expanded to include the City of Omaha, a technical committee was established between the participating organizations to serve as a management mechanism for the program. The purpose of the committee was to initially provide the specifications for the on-line computer system. Today, the committee's role has been expanded to include decisions on technical matters regarding both the CUE and ODIS Programs as they relate to the Omaha DIME file, and to coordinate local usage of the file. The Committee also supervises the manual geocoding work involved in correcting and updating the file to 1975. This committee's structure has worked extremely well and is excellent proof

that intergovernmental cooperation can solve DIME problems. The committee's structure has been predicated on the need for DIME as a local tool and the inability of any one agency within the Omaha area to adequately upgrade and maintain DIME because of financial, staff, and data requirements. The ODIS Technical Committee now consists of five permanent member organizations, each with a specific responsibility:

1. Metropolitan Area Planning Agency (MAPA) - serves as the policy organization for DIME because of Census Bureau requirements. MAPA represents and is responsible for the ODIS Program in rural Douglas, Sarpy, and Pattawattamie Counties, as these areas are not now directly involved involved in the program. MAPA has also supplied 50% of the data processing funds.
2. Omaha City Planning Department - serves as the City of Omaha's coordinating organization and is responsible for the ODIS Program in urban Douglas County (the City of Omaha). City Planning is also providing a computer terminal for ODIS and the source materials for Omaha.
3. Omaha Public Works Department - is providing DIME geocoding staff and has supplied 50% of the data processing funds.
4. Omaha Police Division - provides the technical day-to-day supervision over the geocoding work. (The coding supervisor for the ACG Improvement Program in 1970 is now working for the Omaha Police Division and has fortunately been allowed to participate as the clerical supervisor for ODIS.)
5. Douglas County Systems and Data Processing Center - is providing the technical systems analysis, programming, and data processing services.

ODIS GEOCODING

The ODIS Program consists of two basic phases, one for development of the system (correction, update, and extension operations required to bring DIME to current (1975) status) and one for maintenance of the system (continuing updates and correction of DIME beyond current (1975) status). When the program was initially created in 1974, a geocoding staff could not be funded, so it was hoped that the ODIS Technical Committee could, on a part-time basis (as we all had other duties) do the manual goecoding work required, but in January, 1975, the Omaha Public Works Department was able to hire three staff members (two of whom had worked on the original ACG Improvement Program in 1970) with Federal unemployment funds (under the PWSE Program); thus we have been able to proceed at a much more rapid rate than originally anticipated. The ODIS geocoding staff is working toward the completion of the ODIS development phase (within the Omaha area). Upon completion of that program, the Omaha City Planning Department will assume the ODIS maintenance phase as part of our routine subdivision regulations, annexation and addressing duties, thus "institutionalizing" the program as part of our normal governmental procedures.

ODIS geocoding consists of three activities:

1. Metropolitan Map Series (MMS) revisions.
2. DIME record review.
3. On-line transaction of the revisions.

The MMS correction and update activities under the development phase is designed to revise the MMS to 1975 from local source materials (aerial photos (1 inch equals 200 feet), plat maps (1 inch equals 200 feet)). For this part of the program, we are

strictly following the CUE procedures for the MMS revisions, although we have gone a step further and are maintaining the original MMS scribecoats and overlays in Omaha. The result of this first activity is to correct and update the MMS map sheets for use as the primary source documents for DIME record review.

The second ODIS geocoding work activity consists of a review of DIME records by census tract against the revised MMS map sheets and address maps. For this portion of the program, we have selected only primary DIME segment and topological features from the file for review. From this abridged version of the DIME file, DCSDP has prepared separate census tract computer listing which list all street and non-street features within the tract by record identification number. This listing is then reviewed against the corrected and updated MMS for DIME record correction and update. The result is a listing that reflects changes and deletions to the records within the census tract. We also have an ODIS create form for those records that must be created. Thus, when a census tract is reviewed, the DIME records within the census tract should not only be correct but also up-to-date.

The final and simplest ODIS geocoding activity is the on-line transaction of the revisions made as part of the previous record review. The ODIS Teleprocessing System consists of eight DIME record display formats, on-line to a CRT terminal with one add-update display format for on-line transactions (see request and response #1, on page 442). The add-update display is the most complete, with all primary segment, topological, coordinate, and local code information available from it. The add-update display for this geocoding activity is accessed by record identification number. The system's update capabilities allow for changes to be made in any record on the file by simply entering the proper action code (C for change, D for delete, and A for Add) and then entering the revised information in the proper field. The computer then performs logical edits on the revised information to verify the proper entry of valid information. If the edits locate any errors within the revised information, the display indicates the error for correction. When the display is correct, the new record revised the master DIME file and acknowledges the successful transaction. Additionally, the ODIS update capabilities allow for either deletion or creation of records. The ability to create new records will allow us to continuously extend DIME beyond existing DIME file boundaries.

With the completion of the above ODIS geocoding activities, we have not only been able to correct the residual errors within the 1967 Address Coding Guide and the 1970 DIME features, but we have also updated DIME to the present time. The system works with the census tract as the basic correction unit. Thus, once the tract is revised, it is available for local use. Although the ODIS Program does correct DIME to a high level of accuracy, we still intend to run the revised DIME file against the Census Bureau's CUE edits as a final logical check of the file.

ODIS TELEPROCESSING

ODIS has been created as the teleprocessing system under IBM's IMS (Information Management System) Program, on an IBM system 370 Model 155 computer. As explained previously, the heart of the teleprocessing system is the add-update display format and its associated edits. In addition to the add-update feature of ODIS, a data retrieval system has been created with eight specific DIME information displays. The displays are available from a "request menu" which indicates both the fields necessary for a response and the special function key required for the display. This system also allows for any record identification number appearing on a response screen to be activated to return to the add-update display format for that record. A description of the eight displays follows (see "request menu" and "request/response" numbers 2-9, pp. 145-149).

2. Inquiry by address - The fields necessary for a response are address, street, and area code, if different from Omaha; the response is the add-update screen with the requested record. (Inquiry by address allows us to have limited ADMATCH ability on line. As one application of this ADMATCH on line, the Omaha Police Division plans to utilize this capability to determine whether or not a call for police service is within the City limits of Omaha and thus within their jurisdiction or outside Omaha's City limits and in the jurisdiction of the Douglas County Sheriff.)

3. Boundary Nodes within a Map - The field necessary for response is map number; the response is a series of display screens with a list of all census tract boundary nodes within a map and the associated map-set-mile coordinates for the nodes.

4. Internal Nodes within a Tract - The field necessary for a response is census tract number; the response is a series of display screens with a list of all internal nodes within a tract and the associated map-set-mile coordinates for the nodes.

5. Blocks within a Tract - The field necessary for a response is tract number; the response is a series of display screens with a list of all census blocks within a tract and the associated place and MCD code, additional room is available for transportation zone and police cruiser district.

6. Block Face Chaining - The fields necessary for response are tract number and block number; the response is a display screen showing all records and associated information with the block number requested. (This display and the following two displays allows us to easily check the topological structure of any block within the file.)

7. Internal Node Chaining - The fields necessary for a response are map number, tract number and node number; the response is a display screen showing all records and associated information with a node number requested.

8. Boundary Node Chaining - Same as internal node chaining, but for census tract boundary nodes.

9. Street Name Chaining - The field necessary for a response are street and area code; the response is a series of display screens with a list of all records and associated information for the street requested. The request has the flexibility of selecting all records within the file with different area codes (as shown in Appendix 1-6) or with the same area code.

The advantages of an on-line system vs. the batch environment approach, to DIME are impressive. The most obvious advantages being the efficiency and speed of teleprocessing for file management. Additionally, it has been well established that systems having a large number of manual operations such as CUE are more inclined to have larger error rates than systems requiring few manual operations. By utilizing an on-line system, the number of manual operations has been reduced, thus making the system not only more efficient but less prone to error. Also, on-line systems such as ODIS can be built with various safeguards so as to minimize whatever errors do occur. Finally, teleprocessing systems make it possible for DIME to become as

dynamic as the urban environment it portrays. The interactive nature of teleprocessing allows DIME to be as current as the corrections and updates available to it, whereas within a batch system corrections and updates are allowed to accumulate before processing. Thus, where a batch system will probably be maintained on a monthly basis if not longer, an on-line system can be maintained daily.

In summarizing the differences between ODIS and CUE, we will look at the basic system design of both systems.

CUE - CUE first corrects the 1970 DIME file utilizing the Census Bureau's computer edits, then updates DIME as a separate program. Finally the DIME file boundaries are extended under yet another program. In correcting the 1970 DIME file, CUE makes the assumption that the 1970 MMS maps and ACG are correct and then utilizes logical edits to to check the file. The edit list produced by this procedure must then be reviewed and each potential error solved. The results are then coded onto coding forms, keypunched and then run against DIME with the revisions edited prior to changing the master file. If no errors are made in coding and keypunching, the file is then hopefully, logically corrected.

ODIS - ODIS combines the three maintenance activities (correction, update and extension) into one program. Additionally, ODIS does not make the assumption of the basic accuracy of the 1970 MMS, or the 1967 ACG, because of prior experience with the maps and addresses. The first part of ODIS is to correct and update the MMS as our primary source for DIME record review. This is done on a census tract by census tract basis. Upon the completion of the MMS revision, we then review census tract printouts of DIME records with the revised MMS maps and current address maps. Once completed, we have identified all errors and updates that must be made to the DIME records within the tract with a final product being a printout containing: 1) all old DIME records, 2) all revisions, and 3) coding sheets (ODIS create form) with any additions. These revised printouts are taken directly to the terminal where the changes, deletions, or additions are made to the census tract. As part of this process, the revisions are edited for accuracy and if any problem arises, the operator is immediately notified and the problem is solved. ODIS eliminates the need of problem solving for "potential" errors that would have to be solved under the CUE Program. Also, the immediate edit response of the on-line system allows us to correct any input errors automatically while the data is still fresh in the mind of the operator. DIME extension (or the addition of new DIME records) under ODIS is completed in the same manner as normal DIME records added to the system. Once the tract records have been added, the new information is immediately available for any further revisions.

CONCLUSION

In conclusion, I would like to make a few observations about national DIME policy as viewed from local government. In Omaha, as in many small and medium size

cities throughout the United States, we tend to be isolated from many of the new innovations and technology developed at the Federal level. In many ways this is not a negative situation because it allows us to receive this newly created, untested technology and refine it through local application. In the planning profession we call this approach, eclectric planning, the method of utilizing the experience and example of others, modifying and refining that example to our own requirements, and then applying the results to our own specific situation. ODIS is a perfect example of this method. ODIS utilizes the DIME technology developed by the Census Bureau during the late 1960's and early 1970's, but has refined it in terms of a maintenance program to more adequately meet our own local needs. Additionally, ODIS is not an original creation but rather an idea we brought back from the Atlanta DIME Workshop in 1972, after viewing the instructional system TIDE[2] (Terminal Interactive DIME Environment). The reason I mention this is to illustrate what I think is the proper and necessary role of the federal government and its administrative branches such as the Census Bureau and their response to the technology needs of local government. The federal government should provide three basic things:

1. A source of new innovative technology.
2. The necessary transfer mechanism between this technology and local government.
3. Continuing financial support of local government in applying this technology to meet both local and federal needs.

In response to this first item, the Census Bureau in the mid to late 1960's began a very vigorous research development program through the Census Use Study to develop innovative technology for the 1970 census. As a result of that program, DIME and much of the associated technology were created. The Bureau had most certainly taken a step in the right direction. Unfortunately, the research and technology begun so well under this program has seemed to come to an end. The failure of the Bureau in contunuing their vigorous pursuit of this new technology with an open mind to new approaches, will, I am certain, have far reaching implications.

As a data user in local government who relies very heavily upon the technology developed by the Census Bureau, I would very seriously recommend that the Census Bureau resurrect this very important program. Additionally, the role of the Census Use Study should be expanded to include not only research into DIME maintenance and applications and other geographic base file approaches, but also the creation of a Federal Resource Center for DIME and other geographic base file technology. There is a very real need for the creation of a central source for GBF related documents and software developed at all levels of government throughout the United States. Thousands of dollars are spent annually by local government in the development of duplicative geographic base file technology. This money could potentially be saved by the creation of such a resource center.

Secondly, the Bureau also began through the Census Use Study another excellent program designed to transfer the technology developed as part of the DIME system to State and local government. The DIME Workshop Program begun in 1972 has yielded spectacular results on the local level as the consequence of workshop graduates applying their training in their local communities. Without questions, this program has been one of the Bureau's most successful and should most certainly be continued. In Omaha, the DIME Program would not have continued after 1972 had it not been for the DIME Workshop Program and the local graduates of the program. That program had been so successful that we recently conducted our own DIME/ODIS Workshop in Omaha, utilizing many of the materials of the Census Use Study's original DIME Workshop Program.

Thirdly, and probably most importantly from the local view is the question of financial aid to local government in assisting the development and maintenance of local technology. Probably the most basic problem that local government has had in developing DIME systems nationally has been the lack of continuous Federal support for the program (the on-again off-again approach most certainly does not work). Additionally, there has most certainly not been a unified Federal approach to funding DIME programs. Since the Census Bureau has not until recently directly funded DIME on the local level, they should have at least made sure that other Federal agencies would approach DIME funding in a unified manner. In Omaha, HUD has consistently refused to fund DIME since 1972, although Lincoln, Nebraska, less than 60 miles away, has received substantial HUD support for DIME and related activities. I am afraid this is not an uncommon occurrence nationally. If DIME is to be utilized as part of the 1980 census within the U.S., the situation must radically change. Additionally, if DIME funds are to be made available, who should they be made available to? The regional agencies, as have been the tradition in the past, or to local government. One of the basic problems over the past few years has been the inability of regional agencies to maintain DIME programs that are vitally dependent upon local government for source materials and data processing. I would recommend that maybe a funding split between local and regional agencies for specific DIME maintenance products would be a much more efficient and effective mechanism for DIME development and technology transfer.

In Omaha, the creation of ODIS has definitely not been an overnight development, but rather, has been the evolution of the hard work of many people and organizations. The system is proof that intergovernmental cooperation can and does work effectively to get things done. ODIS or CUE in the final analysis are not the only or maybe the best systems for DIME maintenance, but they are two distinctively different systems, both of which should have potential application in many SMSA's throughout the United States. It is critically important that the technology that has produced DIME, CUE and ODIS, be allowed to continue for the end result, I am certain, will positively effect the quality of local and federal decision making and hopefully provide the needed solutions to urban problems.

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REQUEST 1

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              MAP SET MILES          STATE PLANE              LAT  / LONG
            X-COORD  Y-COORD       X-COORD  Y-COORD       X-COORD  Y-COORD

- - - - - - - - - - - - - - -  T O     N O D E  - - - - - - - - - - - - - - -
            NODE           MAP                          STATE PLANE CODE
              MAP SET MILES          STATE PLANE              LAT  / LONG.
            X-COORD  Y-COORD       X-COORD  Y-COORD       X-COORD  Y-COORD

- - - - - - - - - - - -  L E F T   B L O C K   F A C E  - - - - - - - - - - - -
  ADDRESS                TRACT    AREA    STR          PLACE    ZIP     TRANS    CRUZ
LOW     HIGH    BLOCK  BASIC SUF CODE    JUR    MCD    CODE     CODE    ZONE     DIST


- - - - - - - - - - - -  R I G H T   B L O C K   F A C E  - - - - - - - - - - - -
  ADDRESS                TRACT    AREA    STR          PLACE    ZIP     TRANS    CRUZ
LOW     HIGH    BLOCK  BASIC SUF CODE    JUR    MCD    CODE     CODE    ZONE     DIST
```

RESPONSE 1

```
                    D I M E   F I L E   R E C O R D   U P D A T E
RECORD NUMBER 021315                                          ACTION CODE
        PRFX        STREET NAME          TYPE    SUF    NON-ST     COD LIM
              MADISON                    ST
- - - - - - - - - - - - - - -  F R O M     N O D E  - - - - - - - - - - - - - - -
            NODE   73     MAP  7                       STATE PLANE CODE 55
              MAP SET MILES          STATE PLANE              LAT. / LONG.
            X-COORD  Y-COORD       X-COORD  Y-COORD       X-COORD  Y-COORD
            015523   007337        2980677  0576650       0959357  411947
- - - - - - - - - - - - - - -  T O     N O D E  - - - - - - - - - - - - - - -
            NODE   72     MAP  7                       STATE PLANE CODE 55
              MAP SET MILES          STATE PLANE              LAT  / LONG.
            X-COORD  Y-COORD       X-COORD  Y-COORD       X-COORD  Y-COORD
            015395   007332        2980000  0576595       0959381  411946
- - - - - - - - - - - -  L E F T   B L O C K   F A C E  - - - - - - - - - - - -
  ADDRESS                TRACT    AREA    STR          PLACE    ZIP     TRANS    CRUZ
LOW     HIGH    BLOCK  BASIC SUF CODE    JUR    MCD    CODE     CODE    ZONE     DIST.
 1501    1699   403      28       OMA     OMA    075    1825     68107

- - - - - - - - - - - -  R I G H T   B L O C K   F A C E  - - - - - - - - - - - -
  ADDRESS                TRACT    AREA    STR          PLACE    ZIP     TRANS    CRUZ
LOW     HIGH    BLOCK  BASIC SUF CODE    JUR    MCD    CODE     CODE    ZONE     DIST.
 1500    1698   315      28       OMA     OMA    075    1825     68107
```

REQUEST MENU

```
                D I M E   R E S P O N S E   S C R E E N   S E L E C T I O N

ADDRESS ------------ S T R E E T -------------   AREA  MAP  TRACT   NODE  BLOCK
  NO.    PREFIX         NAME          TYPE SUFFIX  CODE  NO.   NO.     NO    NO

     COMPLETE THE NECESSARY FIELDS AS INDICATED BELOW FOR THE DESIRED SCREEN
     AND DEPRESS THE APPROPRIATE KEY
AVAILABLE RESPONSE SCREENS          FIELDS NECESSARY FOR RESPONSE      DEPRESS
INQUIRY BY ADDRESS                  ADDRESS, STREET, (AREA CODE)       PF 1 KEY

BOUNDARY NODES WITHIN MAP           MAP NO.                            PF 2 KEY

INTERNAL NODES WITHIN TRACT         TRACT NO.                          PF 3 KEY

BLOCKS WITHIN A TRACT               TRACT NO.                          PF 4 KEY

BLOCK FACE CHAINING                 TRACT NO, BLOCK NO                 PF 5 KEY

INTERNAL NODE CHAINING              TRACT NO, NODE NO                  PF 6 KEY

BOUNDARY NODE CHAINING              MAP NO NODE NO.                    PF 7 KEY

STREET NAME CHAINING                STREET, (AREA CODE)                PF 8 KEY
     AREA CODE IS OPTIONAL DEFAULT IS OMA
```

REQUEST 2

```
                D I M E   R E S P O N S E   S C R E E N   S E L E C T I O N

ADDRESS ------------ S T R E E T -------------   AREA  MAP  TRACT   NODE  BLOCK
  NO     PREFIX         NAME          TYPE SUFFIX  CODE  NO.   NO.     NO    NO.
1520           MADISON                ST
     COMPLETE THE NECESSARY FIELDS AS INDICATED BELOW FOR THE DESIRED SCREEN
     AND DEPRESS THE APPROPRIATE KEY
AVAILABLE RESPONSE SCREENS          FIELDS NECESSARY FOR RESPONSE      DEPRESS
INQUIRY BY ADDRESS                  ADDRESS, STREET, (AREA CODE)       PF 1 KEY
```

RESPONSE 2

```
                    D I M E   F I L E   R E C O R D   U P D A T E
RECORD NUMBER 021315                                          ACTION CODE
        PRFX       STREET NAME          TYPE   SUF   NON-ST    COD LIM
                  MADISON                ST
- - - - - - - - - - - - - - -  F R O M   N O D E  - - - - - - - - - - - - - - -
           NODE   73    MAP  7                    STATE PLANE CODE 55
            MAP SET MILES          STATE PLANE          LAT. / LONG.
           X-COORD  Y-COORD      X-COORD  Y-COORD      X-COORD  Y-COORD
           015523   007337       2980677  0576650      0959357  411947
- - - - - - - - - - - - - - -  T O   N O D E  - - - - - - - - - - - - - - -
           NODE   72    MAP  7                    STATE PLANE CODE 55
            MAP SET MILES          STATE PLANE          LAT. / LONG.
           X-COORD  Y-COORD      X-COORD  Y-COORD      X-COORD  Y-COORD
           015395   007332       2980000  0576595      0959381  411946
- - - - - - - - - - - - - -  L E F T   B L O C K   F A C E  - - - - - - - - - - - - -
  ADDRESS              TRACT   AREA   STR          PLACE   ZIP     TRANS   CRUZ
LOW    HIGH   BLOCK BASIC SUF CODE   JUR   MCD    CODE    CODE    ZONE    DIST
 1501   1699  403     28      OMA    OMA   075    1825    68107

- - - - - - - - - - - - -  R I G H T   B L O C K   F A C E  - - - - - - - - - - - -
  ADDRESS              TRACT   AREA   STR          PLACE   ZIP     TRANS   CRUZ
LOW    HIGH   BLOCK BASIC SUF CODE   JUR   MCD    CODE    CODE    ZONE    DIST.
 1500   1698  315     28      OMA    OMA   075    1825    68107
```

REQUEST 3

```
                    D T M E   R E S P O N S E   S C R E E N   S E L E C T I O N

ADDRESS ------------ S T R E E T ------------- AREA  MAP   TRACT   NODE   BLOCK
  NO.     PREFIX         NAME          TYPE SUFFIX CODE  NO.    NO.    NO.    NO.
                                                            7

     COMPLETE THE NECESSARY FIELDS AS INDICATED BELOW FOR THE DESIRED SCREEN
     AND DEPRESS THE APPROPRIATE KEY.
AVAILABLE RESPONSE SCREENS          FIELDS NECESSARY FOR RESPONSE       DEPRESS
BOUNDARY NODES WITHIN MAP           MAP NO.                             PF 2 KEY
```

RESPONSE 3

NODE	MAP	X-COORD	Y-COORD	NODE	MAP	X-COORD	Y-COORD	NODE	MAP	X-COORD	Y-COORD
701	7	015153	010725	702	7	015196	010780	703	7	015217	010808
704	7	015455	010834	705	7	015453	010729	706	7	015449	010649
707	7	015450	010548	708	7	015447	010415	709	7	015453	010330
710	7	015451	010250	711	7	015452	010075	712	7	015385	010040
713	7	015333	010013	714	7	015303	009997	715	7	015287	009976
716	7	015272	009976	717	7	015201	009971	718	7	015093	009975
719	7	015021	009977	720	7	015523	010248	721	7	015594	010246
722	7	015662	010246	723	7	015734	010246	724	7	015799	010245
725	7	015802	010330	726	7	015804	010416	727	7	015803	010549
728	7	015800	010651	729	7	015802	010834	730	7	015804	010909
731	7	015870	010649	732	7	016004	010649	733	7	016072	010648
734	7	016141	010646	735	7	016202	010648	736	7	016203	010671
737	7	016302	010669	738	7	016347	010673	739	7	016397	010671
740	7	016414	010671	741	7	019227	009977	742	7	016414	010618
743	7	016474	010621	744	7	016574	010626	745	7	016689	010621
746	7	015869	010245	747	7	015935	010243	748	7	015934	010185
749	7	015932	010057	750	7	015992	010055	751	7	016052	010054

REQUEST 4

```
                    D T M E   R E S P O N S E   S C R E E N   S E L E C T I O N

ADDRESS ------------ S T R E E T ------------- AREA  MAP   TRACT   NODE   BLOCK
  NO.     PREFIX         NAME          TYPE SUFFIX CODE  NO.    NO     NO.
                                                            28
     COMPLETE THE NECESSARY FIELDS AS INDICATED BELOW FOR THE DESIRED SCREEN
     AND DEPRESS THE APPROPRIATE KEY
AVAILABLE RESPONSE SCREENS          FIELDS NECESSARY FOR RESPONSE       DEPRESS
INTERNAL NODES WITHIN TRACT         TRACT NO.                           PF 3 KEY
```

RESPONSE 4

NODE	MAP	X-COORD	Y-COORD	NODE	MAP	X-COORD	Y-COORD	NODE	MAP	X-COORD	Y-COORD
1	7	015009	007961	2	7	015076	007959	3	7	015015	007839
4	7	015078	007844	5	7	015149	007843	6	7	015216	007841
7	7	015279	007846	8	7	015342	007845	9	7	015406	007868
10	7	015420	007824	11	7	015466	007887	13	7	015008	007716
14	7	015076	007714	15	7	015153	007719	16	7	015218	007718
17	7	015289	007716	18	7	015344	007715	19	7	015407	007720
20	7	015512	007717	21	7	015589	007724	22	7	015637	007723
23	7	015776	007694	24	7	015858	007729	25	7	015080	007583
26	7	015150	007581	27	7	015188	007587	28	7	015213	007586
29	7	015283	007591	30	7	015346	007590	31	7	015388	007589
32	7	015411	007588	33	7	015413	007653	34	7	015458	007594
35	7	015512	007656	36	7	015511	007591	37	7	015594	007595
38	7	015642	007596	39	7	015145	007525	40	7	015193	007523
41	7	015240	007524	42	7	015285	007530	43	7	015343	007525
44	7	015391	007524	45	7	015460	007527	46	7	015518	007531
47	7	015643	007534	48	7	015197	007468	49	7	015240	007466
50	7	015283	007465	51	7	015347	007463	52	7	015390	007462

REQUEST 5

```
                D I M E   R E S P O N S E   S C R E E N   S E L E C T I O N

ADDRESS ------------ S T R E E T -------------   AREA  MAP  TRACT   NODE  BLOCK
  NO.    PREFIX         NAME          TYPE SUFFIX  CODE  NO.   NO.    NO.   NO.
                                                                 28

     COMPLETE THE NECESSARY FIELDS AS INDICATED BELOW FOR THE DESIRED SCREEN
     AND DEPRESS THE APPROPRIATE KEY
AVAILABLE RESPONSE SCREENS          FIELDS NECESSARY FOR RESPONSE       DEPRESS

BLOCKS WITHIN A TRACT               TRACT NO.                           PF 4 KEY
```

RESPONSE 5

BLOCK	PLACE	MCD	TRANS	PCD	BLOCK	PLACE	MCD	TRANS	PCD
001	182	075			101	182	075		
102	182	075			103	182	075		
104	182	075			105	182	075		
106	182	075			107	182	075		
108	182	075			109	182	075		
110	182	075			111	182	075		
112	182	075			113	182	075		
114	182	075			115	182	075		
116	182	075			117	182	075		
118	182	075			119	182	075		
120	182	075			201	182	075		
202	182	075			203	182	075		
204	182	075			205	182	075		
206	182	075			207	182	075		
208	182	075			209	182	075		
210	182	075			211	182	075		
212	182	075			213	182	075		
214	182	075			215	182	075		
216	182	075			217	182	075		
218	182	075			301	182	075		
302	182	075			303	182	075		
304	182	075			305	182	075		

REQUEST 6

```
                D I M E   R E S P O N S E   S C R E E N   S E L E C T I O N

ADDRESS ------------ S T R E E T -------------   AREA  MAP  TRACT   NODE  BLOCK
  NO.    PREFIX         NAME          TYPE SUFFIX  CODE  NO    NO     NO
                                                                 28     403

     COMPLETE THE NECESSARY FIELDS AS INDICATED BELOW FOR THE DESIRED SCREEN
     AND DEPRESS THE APPROPRIATE KEY
AVAILABLE RESPONSE SCREENS          FIELDS NECESSARY FOR RESPONSE       DEPRESS

BLOCK FACE CHAINING                 TRACT NO, BLOCK NO                  PF 5 KEY
```

RESPONSE 6

```
                B L O C K   N U M B E R   C H A I N   R E S P O N S E

TRACT =   28      BLOCK =403      MCD =075   TRANS ZONE =        CRUZ DIST.

---------- S T R E E T --------- N O D E S  M A P  ADDRESS  AREA SIDE NON  REC.
PRE         NAME          TYPE SF FROM  TO  FM TO  LOW  HIGH CODE R/L  ST   ID
 S  015                   ST      73    76  7  7  6500  6598 OMA  R       001653
 S  017                   ST      72    75  7  7  6501  6599 OMA  L       002000
    MADISON               ST      73    72  7  7  1501  1699 OMA  L       021315
    MONROE                ST      76    75  7  7  1500  1698 OMA  R       022331
END OF INQUIRY RESPONSE
```

REQUEST 7

```
                D I M E   R E S P O N S E   S C R E E N   S E L E C T I O N

ADDRESS ------------ S T R E E T -------------   AREA  MAP   TRACT   NODE   BLOCK
  NO     PREFIX         NAME          TYPE SUFFIX  CODE  NO.    NO     NO.    NO.
                                                          7      28     73
     COMPLETE THE NECESSARY FIELDS AS INDICATED BELOW FOR THE DESIRED SCREEN
     AND DEPRESS THE APPROPRIATE KEY.
AVAILABLE RESPONSE SCREENS          FIELDS NECESSARY FOR RESPONSE       DEPRESS

INTERNAL NODE CHAINING              TRACT NO, NODE NO.                  PF 6 KEY
```

RESPONSE 7

```
 NODE =   73   N O D E  N U M B E R  C H A I N  R E S P O N S E
STATE = 55     STATE PLANE    X-COORD = 2980677  Y-COORD = 0576650
               MAP SET MILES  X-COORD = 015523   Y-COORD = 007337
               LAT. / LONG.   X-COORD = 0959357  Y-COORD = 411947
---------- S T R E E T --------- N O D E S  M A P  ADDRESS  AREA SIDE NON  REC
PRE        NAME          TYPE SF FROM  TO  FM TO  LOW  HIGH CODE R/L  ST   ID.
 S  015                  ST       62   73  7  7  6499  6498               001652
 S  015                  ST       73   76  7  7  6501  6500               001653
    MADISON              ST       74   73  7  7  1499  1498               021310
    MADISON              ST       73   72  7  7  1501  1500               021315
END OF INQUIRY RESPONSE
```

REQUEST 8

```
                D I M E   R E S P O N S E   S C R E E N   S E L E C T I O N

ADDRESS ------------ S T R E E T -------------   AREA  MAP   TRACT   NODE   BLOCK
  NO.    PREFIX         NAME          TYPE SUFFIX  CODE  NO.    NO     NO.    NO
                                                          7             0837
     COMPLETE THE NECESSARY FIELDS AS INDICATED BELOW FOR THE DESIRED SCREEN
     AND DEPRESS THE APPROPRIATE KEY
AVAILABLE RESPONSE SCREENS          FIELDS NECESSARY FOR RESPONSE       DEPRESS

BOUNDARY NODE CHAINING              MAP NO. NODE NO                     PF 7 KEY
```

RESPONSE 8

```
 NODE =  837   N O D E  N U M B E R  C H A I N  R E S P O N S E
STATE = 55     STATE PLANE    X-COORD = 2979349  Y-COORD = 0576602
               MAP SET MILES  X-COORD = 015272   Y-COORD = 007338
               LAT. / LONG    X-COORD = 0959405  Y-COORD = 411947
---------- S T R E E T --------- N O D E S  M A P  ADDRESS  AREA SIDE NON  REC.
PRE        NAME          TYPE SF FROM  TO  FM TO  LOW  HIGH CODE R/L  ST   ID
    MADISON              ST       71  837  7  7  1899  1898               021320
    MADISON              ST      837   11  7  7  1901  1900               021322
    RAILROAD             AV      836  837  7  7  6499  6498               024799
    RAILROAD             AV      837  838  7  7  6501  6500               024800
END OF INQUIRY RESPONSE
```

REQUEST 9

```
                D I M E   R E S P O N S E   S C R E E N   S E L E C T I O N

ADDRESS ------------ S T R E E T -------------   AREA  MAP  TRACT   NODE  BLOCK
  NO.    PREFIX          NAME          TYPE SUFFIX  CODE  NO.   NO.    NO.   NO.
                MADISON                ST
     COMPLETE THE NECESSARY FIELDS AS INDICATED BELOW FOR THE DESIRED SCREEN
     AND DEPRESS THE APPROPRIATE KEY.
AVAILABLE RESPONSE SCREENS          FIELDS NECESSARY FOR RESPONSE      DEPRESS:
STREET NAME CHAINING                STREET, (AREA CODE)                PF 8 KEY
     AREA CODE IS OPTIONAL DEFAULT IS OMA
```

RESPONSE 9

```
                S T R E E T   N A M E   C H A I N   R E S P O N S E

STREET NAME      MADISON                ST
                 ---------- L E F T ---------  --------- R I G H T --------
   NODE     MAP     ADDRESS                AREA   ADDRESS                AREA   REC
FROM  TO  FM TO  LOW  HIGH  TRACT  BLOCK  CODE  LOW  HIGH  TRACT  BLOCK  COD    ID.
 323  305  5 5   201   299   7413  138    MIL   200  298   7413   136    MIL   010430
1264   98  3 3   601   699   310   206    COB   600  698   310    101    COB   021308
  70   74  7 7  1201  1299    28   401    OMA  1200 1298    28    317    OMA   021309
 495  496  8 8  1351  1399  10102  705    BEL  1350 1398  10102   705    BEL   021312
 494  495  8 8  1301  1349  10102  705    BEL  1300 1348  10102   705    BEL   021311
  74   73  7 7  1301  1499    28   402    OMA  1300 1498    28    316    OMA   021310
 497  516  8 8  1451  1503  10102  705    BEL  1406 1522  10102   709    BEL   021314
 496  497  8 8  1401  1449  10102  705    BEL  1400 1404  10102   706    BEL   021313
  73   72  7 7  1501  1699    28   403    OMA  1500 1698    28    315    OMA   021315
 516  520  8 8  1505  1599  10102  710    BEL  1524 1640  10102   709    BEL   021316
 520  521  8 8  1601  1731  10102  711    BEL  1642 1758  10102   709    BEL   021317
 521  561  8 8  1733  1863  10102  711    BEL  1760 1876  10102   709    BEL   021318
  72   71  7 7  1801  1849    28   404    OMA  1700 1798    28    314    OMA   021319
  71  837  7 7  1851  1899    28   404    OMA  1800 1898    28    313    OMA   021320
 561  563  8 8  1865  1999  10102  711    BEL  1878 1998  10102   709    BEL   021321
 837   11  7 7  1901  1999    29   225    OMA  1900 1998    29   10899   OMA   021322
 837   11  7 7  1901  1999    29   225    OMA  1900 1998    29   10899   OMA   021322
  10    9  7 7  2101  2299    29   209    OMA  2100 2298    29   10899   OMA   021324
```