Introduction

The Pinellas County Property Appraiser's Office has been working on the complete automated re-mapping of Pinellas County, Florida. The Project is an outgrowth of the Geo-Code/911 Emergency Telephone System that was legislated several years ago. The Property Appraiser Mapping (PAM) Project involves 25 technicians working on photo interpretation, Base Map preparation, ownership compilation, digitizing, plotting, and associated data base creation. The size of the data base (302,000 ownership parcels on 1200 map sheets), hardware, software, "turnkey" operation, and budget have caused some delays, and results are a little less than we had initially expected. The Project is finally on track; we expect that it will take 2-3 years to complete and implement all of the system changes we have planned. One of the unique features of this Project is the financing and personnel that have been provided through CETA Grants. Approximately 70% of the financing and some highly qualified employees have been found and utilized on the Project through CETA. This Project will not only bring the County's Mapping Program into the 20th century, but will also help meet the social needs of some of our citizens.

Historical Background

The Pinellas County Project began in the early part of 1975 when the Pinellas County Criminal Justice System
established the need for Geo-Coding to support a 911 Emergency Telephone System. At the same time the County Planning Department was contemplating a computerized Urban Information System. Because of the interest of both Departments and the importance of developing a Geo Base in the shortest possible period of time to support Project 911 and the Urban Information System, it was recommended that a "turnkey" digitizing system, equipped with one CRT station and a low speed plotter, be selected and purchased.

In 1977, after 2 years and many studies, the "turnkey" system was finally purchased and delivered to the County. A system much larger and more sophisticated than initially recommended was obtained because of the "tremendous potential" for large scale mapping that existed in the County. An understanding was reached that after digitizing for Project 911 was complete, a County Base Map and Property Appraiser overlay would be produced jointly by the Planning Department and the Property Appraiser.

The graphics equipment selected for that Project was an H. Dell Foster (K&E) IGS 330 Interactive Graphic System, complete with a Data General 32K Nova Computer with disk and tape drive, Tektronix 4010 CRT, 35" X 62" back-lighted gantry type digitizer, a 42" X 54" Foster EDP 11/75 Flatbed Plotter, and all associated software. I might note at this point that the system was substantially enlarged within 6 months of purchase with an additional Free Cursor Digitizer, a larger Tektronix 4014 CRT, and an additional 32K of Memory.

The priority project for this new system was to develop XY Coordinates for the Geographic Base File (911). It was estimated that more than 100,000 segments and nodes would have to be digitized and put into the computer system, and that it would take 36 man/months to complete this portion of the Project before actual base mapping could begin. The coordinate gathering portion of the Geographic Base File Program worked extremely well. The County was not only able to complete the skeleton Geo-Code File in a very short period of time, but it was also able to begin developing a Procedures' Manual and to begin training Automated Mapping Technicians on relatively simple tasks,
keeping in mind that much more difficult operations would become necessary as soon as Base mapping began.

**Property Appraiser Mapping (PAM) Project**

The primary purpose of the PAM Project was to develop a set of assessment maps with sufficient data and accuracy to provide the Property Appraiser with a tool to adequately fulfill his Constitutional duty of equitable valuation of all real property in Pinellas County.

The Property Appraiser's existing Cadastral Maps were in such condition that a new set of maps was absolutely necessary.

The advantages of the new computer maps would be many; the new maps would be uniform in appearance, could be easily updated and reproduced, and would be most adaptable for use by many other agencies. Therefore, the decision was made to computer map rather than hand draft.

The PAM Project began in the early part of 1978. The Project was divided into three distinct phases: Base Map Compilation, Digitization, and Property Appraiser Overlays.

A one-year Comprehensive Education Training Act (CETA) Grant in the amount of $185,000 was obtained to begin the Base Map Compilation and Digitization. These Funds were used to hire and train 18 local persons in map compilation and digitizing. After the one-year Project was completed, an 18-month Property Appraiser Overlay CETA Grant was obtained in the amount of $460,000 to complete all phases of the Project. This new Grant would support up to 35 CETA employees, the catch being that maximum wages would be reduced from $4.87 per hour to $3.29 per hour. This shift in financing caused a much longer training period and a doubling of our edit time. I might add at this time that the Project has been most fortunate in the quality of employees that we have been able to hire at salaries just slightly above minimum wage ($3.17 to $4.87). No one thought that we would be able to find qualified people at these rates of pay; the success of the Project has proven them wrong.
Before the actual processes of the PAM Project could begin, a tremendous amount of time and effort went into the new Project planning. We found that a lot of people talked about the ease of doing cadastral maps on a computer, but few people actually had any experience with the mundane problems of inking on Mylar, line types and sizes, scales, annotation styles, level setups, and a myriad of other details. Certainly our "turnkey" system's designers had no conception of the complexity of multi-layered property appraiser maps. Our task was to produce a map that would ultimately be many different things to many people - so simple that the general public could use it, yet accurate and detailed enough for surveyors and abstractors.

As the design and training portion of the Project was being worked on, a detailed Procedures' Manual was being completed at the same time. This Manual dealt with every conceivable work phase of the Project - from Procedure writing to CRT editing - all in plain English, with "computereze". This is a very dynamic Manual; it is updated, changed and added to almost daily.

**Base Map Compilation**

The Base Map compilation began approximately 6 months before the first maps were digitized. The magnitude of this phase of the Project can be understood when you realize that we have more than 1200 maps containing over 302,000 parcels of property in the County. The Base Map was constructed on a paper base by taking semi-rectified photography and comparing the visual placement of major property lines, roads, subdivision boundaries, and physical features with their location on our original paper based cadastral maps. Areas distorted more than 3% were re-compiled using plats, deeds, surveys, and photo interpretation to ensure their accurate, exact placement.

The Base Map was compiled in two individual, distinct phases because of the enormous size of the entire Project. We initially estimated that some 25-30 man-years of time would be necessary for this portion of PAM.
Phase I Compilation involves the initial setup of the Base Map, which includes checking and locating State Plane Coordinate values, subdivision boundaries, section lines, road right-of-ways, and physical features. Phase II Compilation involves the actual process of property ownership mapping. This is accomplished by photo interpretation, field checking, reading deeds and plats, and checking the tax roll. Every piece of property is being checked and delineated on the Base Map, and just to add some excitement to this whole process, our 18 digit property identifier is being revised and changed in this Phase of the Project.

As of this date, Base Mapping Phase I, is 95% complete and Phase II is approximately 10% complete.

Digitization

The PAM digitizing portion of the Project has paralleled the Base Map Compilation - except that it was 6 months later in starting. The PAM Project has utilized two Digitizers for data entry. These machines are in operation 24 hours per day, five days per week. Production in this area has been somewhat less than anticipated. This can be explained in part by the amount of detail included on the maps and because of the length of time a CETA employee can work for the County. It seems that at just about the time we get someone well-trained, his CETA eligibility expires.

We have also experienced a high turnover rate of digitizer Operators, perhaps because computer mapping sounds exciting. When you get right down to it, however, digitizing can be a tedious, boring task, which people do not enjoy after a short period of time.

The data input Base Map is edited and standardized with regard to dimensions, annotation placement, coordinate values, and symbol location before the Automated Mapping Technician begins digitizing and locating the information on one of the 16 assigned levels.

The PAM Project has not discovered any revolutionary data entry methods. However, there are several ideas we have found that increased work throughput. One idea is to have Digitizer Operators only work at the Digitizer and not alternate between CRT editing to
digitizing. We have also found that by covering our Base Map with acetate and checking off entered data information with grease pencil as it is entered we are able to keep our input documents in excellent condition, thus making them easy to read and understand in case re-editing or re-digitization is required. We also use two people instead of one to add our annotation. One person actually aligns the annotation, sets its rotation angle, reads off the data, and spells it. The second person, more proficient at a keyboard, actually enters the data. We have also developed a set of precision templates for exact information location. These templates have really increased the accuracy of our product, taking some burden off of our CRT edit.

The digitizing portion of PAM will take 15 man/years to complete and is approximately 40% finished at this time.

Edit and Plotting

The edit and plotting portion of PAM runs one or two weeks behind digitizing, except for the liquid ink plots, which may not be completed for several months.

The edit is done on 2 graphic CRTs and on hard copy ballpoint pen plots. A quick preliminary check is done on the CRTs to verify that the information has been placed on the correct levels and to see if any levels are missed. Then a check plot is produced using a ballpoint pen on tracing paper for a more detailed visual inspection. Necessary corrections are indicated on the tracing and the correct information is entered on the CRT.

After the tracings are checked and the corrections made in the machine, the map is then re-arranged in a plot file. Two tapes of each map are kept; one tape is kept for Data Processing purposes and data base association, and the other tape is strictly for plotting where levels are grouped into pen size.

The final plotting is done on a Flatbed Plotter using Leroy Font, liquid ink, and mylar. This particular area is where we have experienced much difficulty. The biggest problem is that the Plotter is not a stand alone model and comes to a complete halt in a pen-down position when other peripherals are accessing.
the CPU. Other problems we have with plotting include mylar, ink, pen points, and drafting speed.

The goal of our CRT edit/digitizing function is to produce a quality product from the digitizer that will require slightly less time to edit than to digitize. We continually strive for more production, always being mindful of the increase in edit when this occurs.

The CRT Editors are our most highly skilled Automated Mapping Technicians and must understand the objectives of the entire Project and be fully versed in the use of some 70 edit commands and plotter operations. Editing and plotting will require 20 man/years to complete and at this time is approximately 35% finished.

Conclusion

In conclusion I would like to say that the ultimate beneficiary of Pinellas County's Automated Mapping Program will be the taxpayer, and in a time of shrinking budget dollars and Proposition 13s, this is most appropriate.

This Project is definitely cost effective and will produce so many valuable by-products that I am totally amazed that more political jurisdictions have not undertaken projects of this nature.

The hidden social benefit of the PAM Project has been the employment of over 50 individuals who have contributed and gained from their involvement.

What more can one ask for? A cost effective Project that is technically beneficial to so many and is meeting a social need. A PANACEA at last!