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A Programme For Automatically Generating And Attaching Unique Parcel Identifier To Plots Of Land In Federal Low-Cost Housing Estate, Oyo, Oyo State, Nigeria

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Abstract: **The principal responsibility of the assessor is to locate, inventory, and appraise all property within the jurisdiction. A complete set of maps is necessary to perform this function. Maps help determine the location of property, indicate the size and shape of each parcel, and reveal geographic relationships that affect property value. Maps and map data are important not only for assessors, but also for other governmental agencies, the public, and the land information community. Computerization of map and parcel data can enhance the capability to manage, analyze, summarize, display, and disseminate geographically referenced information.**

Keywords: **parcel, parcel identifier, assessor, identification number, digital cadaster, map layers.**

1. INTRODUCTION

Parcel identification involves one of a number of systems to identify parcels in land data files in order to ensure data coordination and facilitate multiple one of data files in for example a multi-purpose cadastre system. Each parcel identified by unique number. A very good example is the use of a digital cadastre mapping system in the appraisal process. Here parcel in the digital cadastre map layer must be linked to the assessment data such as year built, square metre, sale price, sale data, etc. The key link between parcels and tabular data is the parcel identifiers or the parcel identification number (PIN or parcel ID). The parcel identifier uses a number of codes instead of a complete legal description to uniquely identify one.

The use of a program for any geo-spatial problem or assignment cannot be over emphasized. This is especially true in writing a program for automatically generating and attaching unique parcel identifier to plots of land in an estate. Programming for such an assignment has a lot of advantages. It has an advantage of speed and makes the work easier and accurate. It helps in handling large volumes of data that would be overwhelming or difficult to handle manually. It has ability to solve complex calculations and carrying out repeated execution of work.

2. PROJECT AREA

The project area is the Federal Low Cost Housing Scheme, Oyo partly made up of the cadastral plots shown below.

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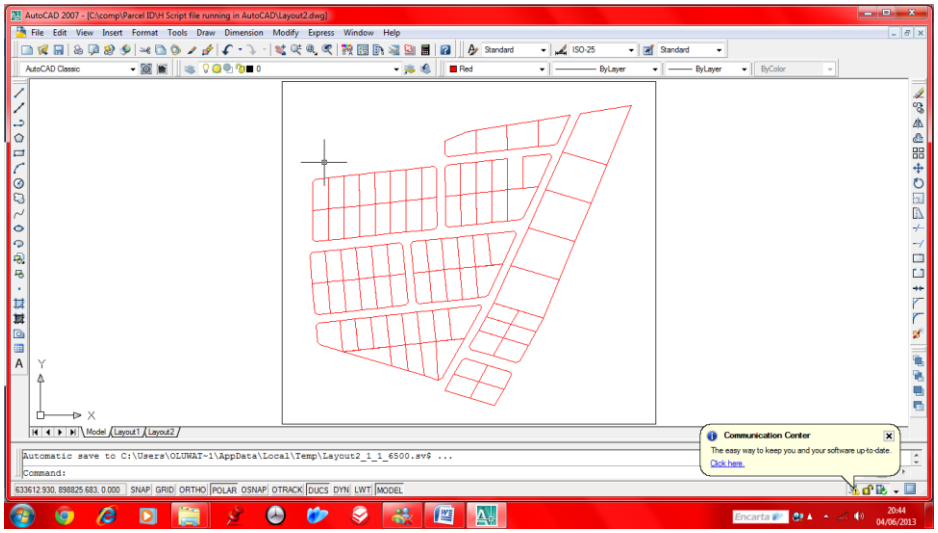


Fig. 1.1 Cadastral plots of part of Federal Low Cost Housing Scheme, Oyo.

SOFTWARE:

Software employed to accomplish the task include:

1. AutoCAD 2007 (Draughting Environment)
2. Visual Basic 6.0 enterprise Edition (programming language)
3. Notepad for editing and preparation of input files

3. SOURCE CODE

1. PARCID.vbp/PARCID.txt

```
Private Sub CMDPARC_Click()
Dim E#(10000), AN#(10000), STN$(10000), M#, N#, PARC$, HT#
P1 = 180: PI = 3.141592654
Open "PARCID.TXT" For Input As #1
Open "PARCID.OUT" For Output As #2
Open "PARCID.SCR" For Output As #3
Print "1 ENTER NUMBER OF PARCELS"
Print "2 ENTER NUMBER OF POINTS+1"
Print "3 ENTER PREFIX, EASTING, NORTHING"
Print "4 REPEAT 3 FOR OTHER POINTS IN THE PARCEL"
Print "5 REPEAT 2-4 FOR OTHER PARCELS"
Print "6 DATA FILE IS PARCID.TXT"
Print "7 OUTPUT FILES ARE PARCID.OUT AND PARCID.SCR"
Print "8 SELECT AUTOCAD USING PLOT"
Print "9 AT AUTOCAD CLICK TOOLS THEN RUN SCRIPT THEN PARCID.SCR"
MsgBox "READ MANUAL"
Print #3, "_units"
Print #3, "2"
Print #3, "3"
Print #3, "5"
Print #3, "8"
Print #3, "n"
Print #3, "y"
```

```
HT = TXTHT
Input #1, M
For I = 1 To M9
Input #1, N
AREA1 = 0: S1 = 0: S2 = 0: PERIM = 0
Print #3, "_COLOR"
Print #3, "WHITE"
For J = 1 To N
Input #1, STN(J), E(J), AN(J)
If J < N Then
S1 = S1 + E(J): S2 = S2 + AN(J)
Else
End If
If J > 1 Then
E1 = E(J) - E(J - 1)
E2 = AN(J) - AN(J - 1)
D = Sqr(E1 ^ 2 + E2 ^ 2)
AREA1 = AREA1 + E(J - 1) * AN(J) - AN(J - 1) * E(J)
PERIM = PERIM + D
Print #2, "DISTANCE "; STN(J - 1); " TO "; STN(J); " "; D; " ";
If E2 <> 0 Then
BB = Atn(E1 / E2)
If E2 < 0 Then BB = PI + BB
If S2 > 0 And E1 < 0 Then BB = 2 * PI + BB
Else
End If
If E1 > 0 And E2 = 0 Then BB = PI / 2
If E1 < 0 And E2 = 0 Then BB = 3 * PI / 2
If E1 = 0 And E2 < 0 Then BB = PI
BB = BB * P1 / PI
U = Int(BB)
U1 = (BB - U) * 60
U2 = Int(U1)
U3 = (U1 - U2) * 60
Print #2, "BEARING= "; U; " "; U2; " "; U3
Print #3, "_TEXT"
Write #3, E(J - 1) + (D / 2 - HT * 3) * Sin(BB * PI / P1), AN(J - 1) + (D / 2 - HT * 3) * Cos(BB * PI / P1)
Write #3, HT
AA$ = "D"
BB1$ = BB
CC = BB1$ + AA$
Print #3, CC
Print #3, Format(D, "##0.00")
Print #3, "-TEXT"
E1 = E(J - 1) + D / 8 * Sin(BB * PI / P1)
E2 = AN(J - 1) + D / 8 * Cos(BB * PI / P1)
Write #3, E1, E2
Write #3, HT
```

```
AA$ = "D"
BB1$ = BB
CC = BB1$ + AA$
Print #3, CC
Write #3, U
Print #3, "-TEXT"
E1 = E(J - 1) + (D - HT * 3) * Sin(BB * PI / P1)
E2 = AN(J - 1) + (D - HT * 3) * Cos(BB * PI / P1)
Write #3, E1, E2
Write #3, HT
AA$ = "D"
BB1$ = BB
CC = BB1$ + AA$
Print #3, CC
Write #3, U2
Else
End If
Next J
Print #3, "COLOR"
Print #3, "WHITE"
For J = 1 To N - 1
Print #3, "_TEXT"
Write #3, E(J), AN(J)
Write #3, HT
Print #3, "90D"
Print #3, STN(J)
Next J
AREA1 = Abs(AREA1 / 2)
PARCI$ = I
PARC = "PARCEL" + PARCI$
Print #2, "AREA= "; AREA1; " PERIMETER= "; PERIM; " PARCEL ID= "; PARC
S1 = S1 / (N - 1): S2 = S2 / (N - 1)
Print #3, "_TEXT"
Write #3, S1, S2 + 4 * HT
Write #3, HT
Print #3, "90D"
Print #3, PARC
Print #3, "_TEXT"
Write #3, S1, S2 + HT * 2
Write #3, HT
Print #3, "90D"
Print #3, AREA1
Print #3, "_TEXT"
Write #3, S1, S2
Write #3, HT
Print #3, "90D"
Print #3, PERIM
Print #3, "_COLOR"
```

```
Print #3, "RED"
Print #3, "_PLINE"
For J = 1 To N
Write #3, E(J), AN(J)
Next J
Print #3, ""
Next I
Close #1, #2, #3
XX = Shell("WORDPAD.EXE PARCID.OUT", 1)
XX = Shell("WORDPAD.EXE PARCID.SCR", 1)
MsgBox ""
XX = Shell("PLOT.EXE", 1)
End Sub
```

- Additional files i.e. Default files automatically generated by Visual Basic (the implementing software). They are:

i. MSSCCPrj.Scc (Microsoft source safe status)

```
[SCC]
SCC=This is a source code control file
[PARCID.vbp]
SCC_Project_Name=this project is not under source code control
SCC_Aux_Path=<This is an empty string for the mssccprj.scc file>
```

ii. PACID.VBW (VB project work space)

TARGET CODE

This is the executable version of the source code i.e. PARCID.exe

4. INPUT/DATA FILE

This is the file in which we have entries (e.g. Eastings, Northings, of corner points) serving as source file for the executing of the project.

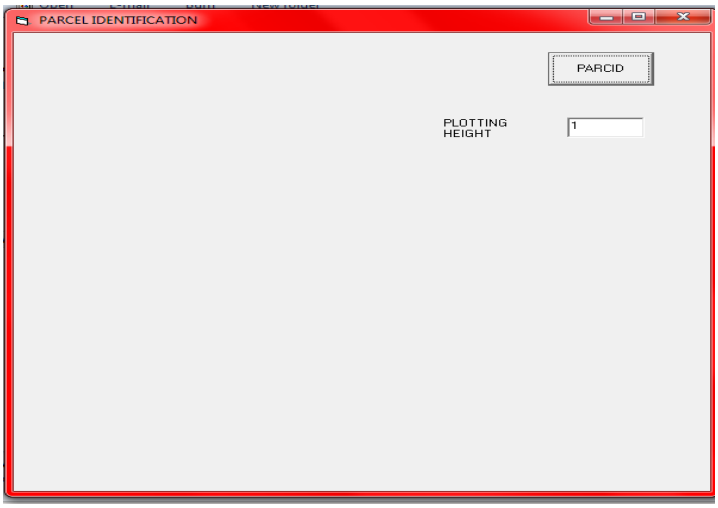
Sample of input/data file

```
7 (no of parcels)
5 (no of boundary points per parcel)
A2,633720.554,898653.679
A3,633748.018,898656.669
A4,633726.379,898618.246
A5,633722.755,898616.775
A2,633720.554,898653.679
5
A6,633705.642,898652.056
A7,633720.554,898653.679
A8,633722.755,898616.775
A9,633709.052,898620.82
A6,633705.642,898652.056
5
A10,633690.73,898650.432
A11,633705.642,898652.056
A12,633709.052,898620.82
```

A13,633693.461,898625.422
A10,633690.73,898650.432
5
A14,633675.818,898648.809
A15,633690.73,898650.432
A16,633693.461,898625.422
A17,633677.869,898630.024
A14,633675.818,898648.809
4
A18,633630.811,898643.913
A19,633675.818,898648.809
A20,633677.869,898630.024
A18,633630.811,898643.913
7
A21,633605.175,898668.782
A22,633607.446,898671.543
A23,633627.699,898673.748
A24,633630.811,898643.913
A25,633609.105,898650.321
A26,633606.492,898653.519
A21,633605.175,898668.782
5
A27,633627.699,898673.748
A28,633642.61,898675.371
A29,633645.378,898645.499
A30,633630.811,898643.913
A27,633627.699,898673.748

5. RUNNING OF THE PROGRAM

- Double checking the target code (either on the desktop or in start menu)
- Click command button named PARCID



- Click OK. This will run and automatically generate parcel ID, computing area, perimeter, bearing and distance, etc.

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6. OUTPUT FILES

These are result files generated after running the program, PARCID. exe. They include:

1. PARCID.OUT containing the distance, bearing, perimeter, and area of all parcels

Sample

DISTANCE A2 TO A3 27.6262808934163 BEARING= 83 47 12.0884377858192

DISTANCE A3 TO A4 44.0973156779397 BEARING= 569 23 14.1640042085055

DISTANCE A4 TO A5 3.91116568297909 BEARING= 607 54 27.0602564157889

DISTANCE A5 TO A2 36.9695769112734 BEARING= 356 35 12.6681817617964

AREA= 563.763244628906 PERIMETER= 112.604339165609

PARCEL ID= PARCEL1

DISTANCE A6 TO A7 15.0000624332168 BEARING= 83 47 18.4635955509168

DISTANCE A7 TO A8 36.9695769112734 BEARING= 176 35 12.6681817617964

DISTANCE A8 TO A9 14.2875552142008 BEARING= 286 26 46.0224599081494

DISTANCE A9 TO A6 31.4215816916068 BEARING= 353 46 11.1163556080237

AREA= 484.059020996094 PERIMETER= 97.6787762502978

PARCEL ID= PARCEL2

2. PARCID.SCR ie. Scrip file continue the generated parcel IDS, perimeter, area etc.

Sample

_units
2
3
5
8
n
y
_COLOR
WHITE
_TEXT
633731.303622447,898654.849309173
1
83.7866912327183D
27.63
-TEXT
633723.987,898654.05275
1
83.7866912327183D
83
-TEXT
633745.035622447,898656.344309173
1

83.7866912327183D
47
_TEXT
633738.670630403,898640.071468645
1
569.387267778947D
44.10
-TEXT
633745.313124994,898651.866125003
1
569.387267778947D
569
-TEXT
633727.851130379,898620.859968658
1
569.387267778947D
23
_TEXT
633727.346733942,898618.638808119
1
607.907516737893D
3.91
-TEXT
633725.926,898618.062125001
1
607.907516737893D
607
-TEXT
633725.534733941,898617.903308121
1
607.907516737893D
54
_TEXT
633721.83310633,898632.232321423
1
356.586852272712D
36.97
-TEXT
633722.479875004,898621.388
1
356.586852272712D
356
-TEXT
633720.732606346,898650.684321424
1

356.586852272712D
35
COLOR
WHITE
_TEXT
633720.554,898653.679
1
90D
A2
_TEXT
633748.018,898656.669
1
90D
A3
_TEXT
633726.379,898618.246
1
90D
A4
_TEXT
633722.755,898616.775
1
90D
A5
_TEXT
633729.4265,898640.34225
1
90D
PARCEL1
_TEXT
633729.4265,898638.34225
1
90D
563.763244628906
_TEXT
633729.4265,898636.34225
1
90D
112.604339165609
_COLOR
RED
_PLINE
633720.554,898653.679
633748.018,898656.669
633726.379,898618.246

633722.755,898616.775
633720.554,898653.679
_COLOR
WHITE
_TEXT
633710.115612413,898652.542901351
1
83.7884621098753D
15.00
-TEXT
633707.506,898652.258875
1
83.7884621098753D
83
-TEXT
633717.571612413,898653.354401351
1
83.7884621098753D
47
_TEXT
633721.475893676,898638.221678577
1
176.586852272712D
36.97
-TEXT
633720.829124998,898649.066
1
176.586852272712D
176
-TEXT
633722.576393668,898619.769678577
1
176.586852272712D
35
_TEXT
633718.780759223,898617.948159454
1
286.446117349974D
14.29
-TEXT
633721.042125,898617.280625001
1
286.446117349974D
286
-TEXT

633711.929259225,898619.970659459
1
286.446117349974D
26
_TEXT
633707.672572418,898633.455718558
1
353.769754543224D
31.42
-TEXT
633708.625750003,898624.7245
1
353.769754543224D
353
-TEXT
633705.967572431,898649.073718559
1
353.769754543224D
46
COLOR
WHITE
_TEXT
633705.642,898652.056
1
90D
A6
_TEXT
633720.554,898653.679
1
90D
A7
_TEXT
633722.755,898616.775
1
90D
A8
_TEXT
633709.052,898620.82
1
90D
A9
_TEXT
633714.50075,898639.8325
1
90D
PARCEL2

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7. SCRIPT FILE RUNNING IN AUTOCAD ENVIRONMENT

1. AutoCAD lunched automatically by target code (program)
2. Go to tools menu to check run script
3. Double click PARCID.SCR and this will automatically plot all the parcels and attach the parcel IDS, area, perimeter, bearing and distances as shown below.

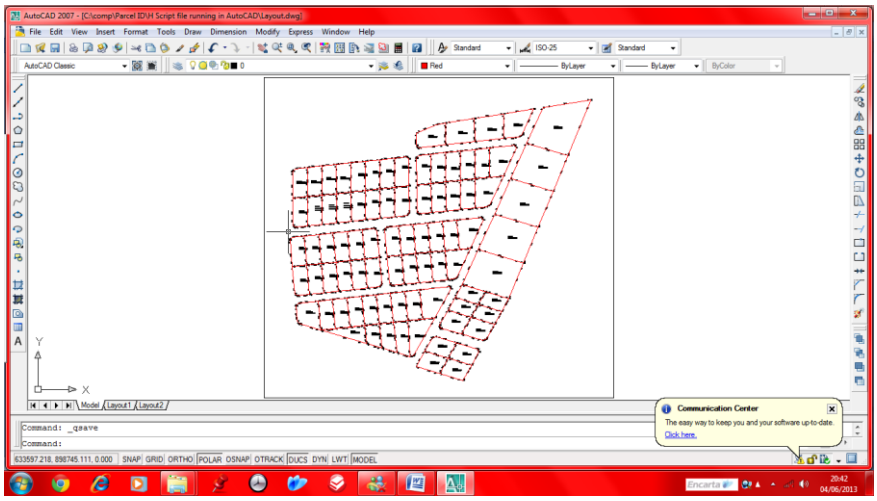

Fig. 1.2 Cadastral plots of part of Federal Low Cost Housing Estate, Oyo with PARCEL IDs automatically generated and attached to individual parcel.

8. CONCLUSION

The program developed can now automatically generate and attach parcel identifiers to plots in any cadastral system. This will enhance easier handling and management of large volume of data, ensure data coordination and facilitate multiple handling of data files in a multiple-purpose cadastral system.

With all the benefits highlighted, this program may be recommended for use to enhance a sustainable development in a land information management system.

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