

GACAD

GEOMLIB (β)

**MARINE ENGINEERING GEOPHYSICAL
DATA PROCESSING TOOLBOX**

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08.11.2019

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1 Auto Cad scripts

Create AutoCad scripts for English Language with elementary figures. There are several functions (*Table 1*); each of them sends strings to script-file.

In accordance AutoCad “snap”, it is recommend to use function `gAcadZoom(fId,[0 0 0.0001],4)`; first in the script body or `gAcadOsnap(fId,'off')`; or manual control the snap is switch off. Otherwise incorrect script drawing is possible.

Table 1 gAcad functions

Function name	Function description
<code>gAcadColor</code>	Set color
<code>gAcadZoom</code>	Set zoom
<code>gAcadLayerMake</code>	Create layer
<code>gAcadOsnap</code>	Send “osnap” command
<code>gAcadSendCommand</code>	Send “osnap” command
<code>gAcadCircle</code>	Draw Circle
<code>gAcadText</code>	Draw Text
<code>gAcadPline</code>	Draw Polyline
<code>gAcadPolygon</code>	Draw one poly-line with Hatch
<code>gAcadImage</code>	Insert image in XY coordinates with scale m
<code>gAcadGeoReffImage</code>	Insert image using World-file data
<code>gAcadTrackMask</code>	Draw Track-plot with Mask
<code>gAcadGraph</code>	Draw Track-plot with Graph
<code>gAcadWiggle</code>	Draw Wiggle in XY coordinates
<code>gAcadWiggleMask</code>	Draw Wiggle in XY coordinates with Mask

1.1 Set color

function `gAcadColor(fId,ColorRGB)`

Write "default rgb-color" to AutoCad script file.

Parameters:

`fId` – file identifier;

`ColorRGB` – [R G B] color vector.

Function Example:

```
>> X=[1 2 3 5]';Y=[4 5 7 10]'; fId=fopen('c:\temp\112.scr','w');gAcadZoom(fId,[0 0 0.0001],4);  
>> gAcadColor(fId,[255 0 0]);gAcadCircle(fId,X,Y,1,[2 2 0]);  
>> gAcadText(fId,X-0.5,Y-0.5,2,0,X,[2 2 1]);fclose(fId);
```

1.2 Set zoom

function gAcadZoom(fId,XYM,dgt)

Write "zoom" to AutoCad script file. Warning!!! There is some problem with "zoom" command for AutoCadCivil.

Parameters:

fId – file identifier;

XYM – [x-coordinate (right/E), y-coordinate (up/N), scale] for zoom;

dgt – printing digits after decimal points for XYM column (if isempty - dgt=5).

Function Example:

```
>> fId=fopen('c:\temp\113.scr','w');gAcadZoom(fId,[0 0 0.0001],4);fclose(fId);
```

1.3 Create layer

function gAcadLayerMake(fId,layerName)

Write to AutoCad script file: make layer (create and set active).

Parameters:

fId – file identifier;

layerName – layer name; layer 1)will be create and set active; 2)if layer exist, it is set active and turned on.

Function Example:

```
>> fId=fopen('c:\temp\112.scr','w');gAcadLayerMake(fId,'layer1');fclose(fId);
```

1.4 Send “osnap” command

function gAcadOsnap(fId,key)

Write "-osnap" command with Key to AutoCad script file. Usually used for swith off snap for true script execution.

Parameters:

key – key for "-osnap" command: 'off','end', etc.

Function Example:

```
>> X=[1 2 3 5];Y=[4 5 7 10];fId=fopen('c:\temp\112.scr','w');gAcadOsnap(fId,'off');gAcadColor(fId,[255 0 0]);gAcadCircle(fId,X,Y,1,[2 2 0]);gAcadText(fId,X-0.5,Y-0.5,2,0,X,[2 2 1]);fclose(fId);
```

1.5 Send command

function gAcadSendCommand(fId,keyZ)

Write defined command+CR+LF to AutoCad script file.

Parameters:

keyZ – command send to AutoCad.

Function Example:

```
>> fId=fopen('c:\temp\112.scr','w');gAcadSendCommand(fId,'-osnap off');gAcadSendCommand(fId,'-color truecolor 10,10,0');fclose(fId);
```

1.6 Draw Circle

function gAcadCircle(fId,X,Y,R,dgt)

Write to AutoCad script file: draw circles in X(:),Y(:) coordinates, with radius R(:).

Parameters:

fId – file identifier;

X – x-coordinate vector (right/E);

Y – y-coordinate vector (up/N);

R – radius (scalar or vector);

dgt – printing digits after detimal points for X, Y and R columns (if isempty - dgt=[5 5 1]).

AutoCad script line example: **Circle 582160.91000,5306794.61000 1**

Function Example:

```
>> X=[1 2 3 5]';Y=[4 5 7 10]';
>> fId=fopen('c:\temp\112.scr','w');gAcadZoom(fId,[0 0 0.0001],4);
>> gAcadColor(fId,[255 0 0]);gAcadCircle(fId,X,Y,1,[2 2 0]);
>> gAcadText(fId,X-0.5,Y-0.5,2,0,X,[2 2 1]);fclose(fId);
```

1.7 Draw Text

function gAcadText(fId,X,Y,FontSize,TextRotAngle,AText,dgt)

Write to AutoCad script file: draw texts in X(:),Y(:) coordinates, with size FontSize(:) and angle TextRotAngle(:).

Parameters:

fId – file identifier;

X – x-coordinate vector (right/E);

Y – y-coordinate vector (up/N);

FontSize – text's font size (scalar or vector);

TextRotAngle – text's rotation angle (scalar or vector);

AText – writing text: 1) vector with a numbers; 2) cell-vector with a strings; 3) single char string for single point.

dgt – printing digits number after decimal points for X,Y and AText (if isempty - dgt=[5 5 0]).

AutoCad script line example: `Text 1.00000,1.00000 5 0 1`

Function Example:

```
>> X=[1 2 3 5];Y=[4 5 7 10];
>> fId=fopen('c:\temp\112.scr','w');gAcadZoom(fId,[0 0 0.0001],4);
>> gAcadColor(fId,[255 0 0]);gAcadCircle(fId,X,Y,1,[2 2 0]);
>> gAcadText(fId,X-0.5,Y-0.5,2,0,X,[2 2 1]);fclose(fId);
```

1.8 Draw Polyline

function gAcadPline(fId,X,Y,dgt)

Write to AutoCad script file: draw one poly-line in X(:),Y(:) coordinates.

Parameters:

fId – file identifier;

X – x-coordinate vector (right/E);

Y – y-coordinate vector (up/N);

dgt – printing digits after decimals points for X and Y (if isempty - dgt=[5 5]).

AutoCad script line example:

`pline 1.00000,1.00000 2.00000,1.00000 3.00000,1.00000 4.00000,1.00000 5.00000,1.00000`

Function Example:

```
>> X=[1 2 3 5 6 7 8];Y=[1 2 4 7 11 16 22];
>> fId=fopen('c:\temp\112.scr','w');gAcadZoom(fId,[0 0 0.0001],4);
>> gAcadColor(fId,[255 0 0]);gAcadPline(fId,X,Y,[2 2]);fclose(fId);
```

1.9 Draw Polygon

function gAcadPolygon(fId,X,Y,ColorLine,ColorHatch,dgt)

Write to AutoCad script file: draw one poly-line with Hatch in X(:),Y(:) coordinates. The poly-line is auto closed (first point will be added to end).

Parameters:

fId – file identifier;

X – x-coordinate vector (right/E);

Y – y-coordinate vector (up/N);

ColorLine – line [R G B] color vector; if isempty, than not changed;

ColorHatch – hatch [R G B] color vector; if isempty, than not changed;

TransparencyHatch – hatch transparency in percent from 0 to 100 (if isempty, than not set);

dgt – printing digits after detimal points for X and Y (if isempty - dgt=[5 5]).

Using functions: gAcadColor.

Function Example:

```
>> X=[1 2 3 5 6 7 8]';Y=[1 2 4 7 11 16 22]';  
>> fId=fopen('c:\temp\112.scr','w');gAcadZoom(fId,[0 0 0.0001],4);  
>> gAcadPolygon(fId,X,Y,[255 0 0],[0 255 0],50,[2 2]);fclose(fId);
```

1.10 Insert Image

function gAcadImage(fId,fR,XY,m,Ang)

Write to AutoCad script file: insert image in XY coordinates with scale m (mean that horizontal images' length is 1). Tiff-image convert to png format.

Parameters:

fId – file identifier;

fR – path to image file (string);

XY – left down images' corner coordinates [x-coordinate(right/E) y-coordinate(up/N)];

m – scale (mean that horizontal images' length is 1);

Ang – rotation angle (around XY, left rotation in degree).

AutoCad script line example:

Function Example:

```
>> fId=fopen('c:\temp\112.scr','w');  
>> gAcadImage(fId,'c:\temp\2017_12_04_doc20171206203403_004.jpg',[10 10],1,0); fclose(fId);
```

1.11 Insert Geo-referenced Image

function gAcadGeoReffImage(fId,fR)

Write to AutoCad script file: insert image to XY coordinates using World-file (tfw, jfw and same). Tiff image convert to png format.

Parameters:

fId – file identifier;

fR – path to image file (string), includes image extension.

Function Example:

```
>> fId=fopen('c:\temp\112.scr','w');gAcadGeoReffImage(fId,'c:\temp\Prod02.tif');fclose(fId);  
>> fId=fopen('c:\temp\112.scr','w');for n=1:23,gAcadGeoReffImage(fId,['c:\temp\1\' num2str(n,'%02d')  
'\tif']);end;fclose(fId);
```

===== World-file lines =====

Line1_A: x-component of the pixel width (x-scale);

Line2_D: y-component of the pixel width (y-skew);

Line3_B: x-component of the pixel height (x-skew);
 Line4_E: y-component of the pixel height (y-scale), typically negative.
 Line5_C: x-coordinate of center of upper left pixel;
 Line6_F: y-coordinate of center of upper left pixel.

=====

1.12 Draw Track-plot with Mask

function gAcadTrackMask(fId,X,Y,mask,FontSize,TextRotAngle,AText,dgt)

Write to AutoCad script file: draw one TrackPlot in X(:),Y(:) coordinates with out-of-data by mask.

Parameters:

fId – file identifier;

X – x-coordinate vector (right/E);

Y – y-coordinate vector (up/N);

mask – mask for each point; 0/false is not drawing point; the poly-line will cut for a number of segments;

FontSize – text's font size (scalar or vector);

TextRotAngle – text's rotation angle (scalar or vector);

AText – writing text string “in start point” for each segment;

dgt – printing digits number after detimal points for X,Y and AText (if isempty - dgt=[5 5 0]).

Using functions: gAcadPline, gAcadText.

Function Example:

```
>> x=[1 2 3 4 5 6 7 8 9 10];y=[1 3 4 1 5 6 1 1 2 3];m=[1 1 1 1 0 0 1 1 1 1];
>> fId=fopen('c:\temp\112.scr','w');gAcadZoom(fId,[0 0 0.0001],4);gAcadColor(fId,[255 0 0]);
>> gAcadTrackMask(fId1,x,y,m,1,90,'E95',[2 2 1]);fclose(fId);
```

AutoCad script line example:

```
zoom c 0.0000,0.0000 0.0001
-layer m "Track_GpsRaw"

pline 1.00,1.00 2.00,3.00 3.00,4.00 4.00,1.00

text 1.00,1.00 1 90 E95
pline 7.00,1.00 8.00,1.00 9.00,2.00 10.00,3.00

text 7.00,1.00 1 90 E95
```


1.13 Draw Track-plot with Graph

function gAcadGraph(fId,X,Y,T,Ang,ColorGraph,ColorTrack,dgt)

Write to AutoCad script file: draw plot T relativeiy to trackplot in X,Y coordinates.

Parameters:

fId – file identifier;

X – x-coordinate vector (right/E);

Y – y-coordinate vector (up/N);

T – graph-line value vector;

Ang – plot-line rotation angle (one number; 0- up/N, right/clockwise rotation sign is +);

ColorGraph – graph [R G B] color vector; if isempty, than not changed;

ColorTrack – track-line [R G B] color vector; if isempty, than not changed;

dgt – printing digits after decimal points for X and Y (if isempty - dgt=[5 5]). Using functions: gAcadColor.

Function Example (*Figure 1*):

```
>> X=[1 2 3 4 5 6 7 8];Y=[1 2 4 7 11 16 22 30];T=[0 1 5 1 -2 -4 -4 -2];  
>> fId=fopen('c:\temp\1.scr','w');gAcadZoom(fId,[0 0 0.0001],4);  
>> gAcadGraph(fId,X,Y,T,0,[255 0 0],[0 255 0],[2 2]);fclose(fId); %red  
>> fId=fopen('c:\temp\2.scr','w');gAcadZoom(fId,[0 0 0.0001],4);  
>> gAcadGraph(fId,X,Y,T,45,[255 255 0],[0 255 0],[2 2]);fclose(fId); %yellow
```

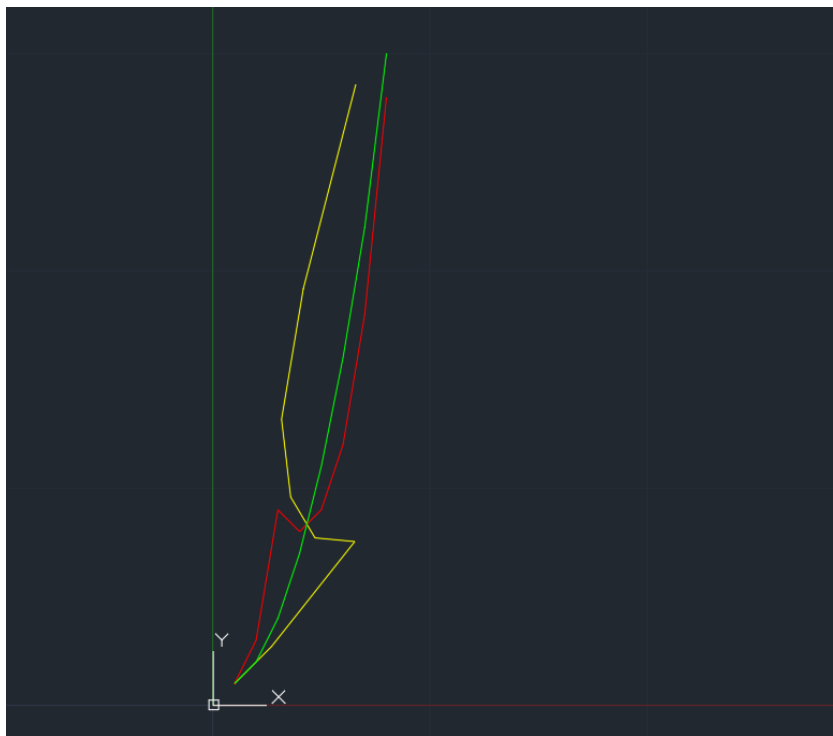


Figure 1 gAcadGraph example result (two scripts in AutoCad window)

1.14 Draw Track-plot with Wiggle

function gAcadWiggle(fId,X,Y,T,Ang,ColorLine,ColorHatch1,ColorHatch2,TransparencyHatch,FontSize,TextRotAngle,AText,dgt)

Write to AutoCad script file: draw Wiggle in X(:),Y(:) coordinates.

Parameters:

fId – file identifier;

X – x-coordinate vector (right/E);

Y – y-coordinate vector (up/N);

T – wiggle-line value vector;

Ang – wiggle-line rotation angle (scalar; 0- up/N, right/clockwise rotation sign is +);

ColorLine – wiggle-line color (scalar); if isempty, than not changed;

ColorHatch1 – wiggle-hatch1 (up zero) [R G B] color; if isempty, than not changed;

ColorHatch2 – wiggle-hatch2 (down zero) [R G B] color; if isempty, than not changed;

TransparencyHatch – hatch transparency in percent from 0 to 100 (if isempty, than not set);

FontSize – text's font size (scalar or vector);

TextRotAngle – text's rotation angle (scalar or vector);

AText – writing text string “in start point” for each segment;

dgt – printing digits number after detimal points for X,Y and AText (if isempty - dgt=[5 5 0]). Using functions: gAcadColor.

Function Example (*Figure 2*):

```
>> X=[1 2 3 4 5 6 7 8];Y=[1 2 4 7 11 16 22 30];T=[0 1 5 1 -2 -4 -4 -2];
```

```
>> fId=fopen('c:\temp\112.scr','w');gAcadZoom(fId,[0 0 0.0001],4);
```

```
>> gAcadWiggle(fId,X,Y,T,90,[0 0 255],[255 0 0],[0 255 0],50,1,90,'E95',[2 2 1]);fclose(fId);
```

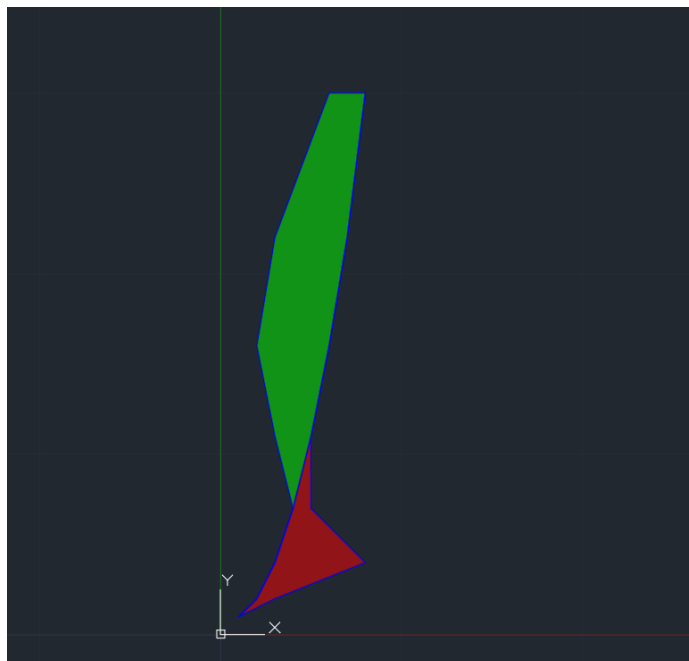


Figure 2 gAcadWiggle example result (script in AutoCad window)

1.15 Draw Track-plot with Wiggle and Mask

function gAcadWiggleMask(fId,X,Y,T,mask,Ang,ColorLine,ColorHatch1,ColorHatch2,TransparencyHatch,FontSize,TextRotAngle,AText,dgt)

Write to AutoCad script file: draw one WiggleToMap in X(:),Y(:) coordinates with out-of-data by mask.

Parameters:

fId – file identifier;

X – x-coordinate vector (right/E);

Y – y-coordinate vector (up/N);

T – wiggle-line value vector;

mask – mask for each point; 0/false is not drawing point; the Wiggle will cut for a number of segments;

Ang – wiggle-line rotation angle (scalar; 0- up/N, right/clockwise rotation sign is +);

ColorLine – wiggle-line color (scalar); if isempty, than not changed;

ColorHatch1 – wiggle-hatch1 (up zero) [R G B] color; if isempty, than not changed;

ColorHatch2 – wiggle-hatch2 (down zero) [R G B] color; if isempty, than not changed;

TransparencyHatch – hatch transparency in percent from 0 to 100 (if isempty, than not set);

FontSize – text's font size (scalar or vector);

TextRotAngle – text's rotation angle (scalar or vector);

AText – writing text string “in start point” for each segment;

dgt – printing digits number after detimal points for X,Y and AText (if isempty - dgt=[5 5 0]).

Using functions: gAcadWiggle.

Function Example (*Figure 3*):

```
>> X=[1 2 3 4 5 6 7 8];Y=[1 2 4 7 11 16 22 30];T=[0 1 5 1 nan nan -4 -2];mask=logical([1 1 1 1 0 0 1 1]);  
>> fId=fopen('c:\temp\112.scr','w');gAcadZoom(fId,[0 0 0.0001],4);  
>> gAcadWiggleMask(fId,X,Y,T,mask,90,[0 0 255],[255 0 0],[0 255 0],50,1,90,'E95',[2 2 1]);  
>> fclose(fId);
```



Figure 3 gAcadWiggleMask example result (script in AutoCad window)

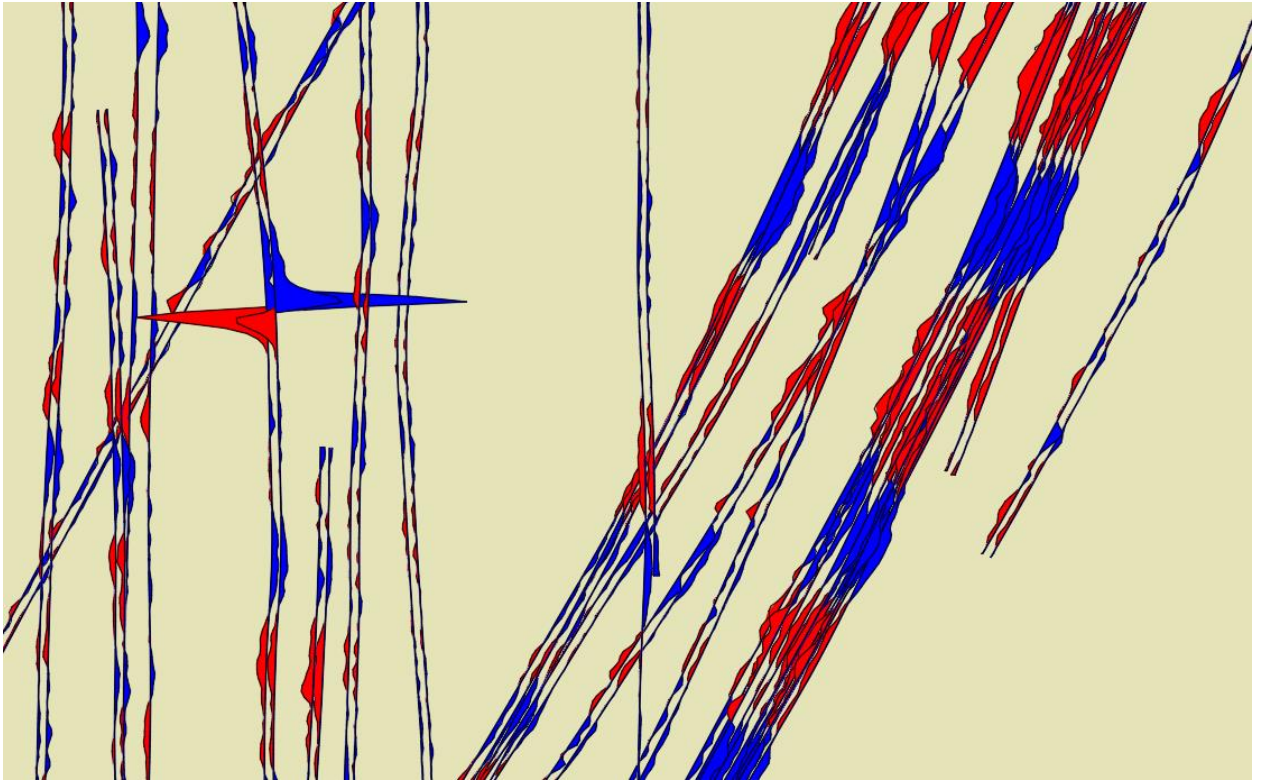


Figure 4 gAcadWiggleMask function result (script in AutoCad window); draw magnetic survey data along survey lines

2 Example

```
function gMapPL2AcadExport(fName,PL,PLNameAttr,CircleAttr,CircleNameAttr,DigitNum,flLayers)
%Export Poly lines structure to AutoCad script
%gMapPL2AcadExport(fName,PL,PLNameAttr,CircleAttr,CircleNameAttr,DigitNum,flLayers), where
%fName - file or folder name for export; if fName(end)=='\ ', then each PL write to file [PL(n).PLName '.scr'];
%PL - polyline structure: PL(n).PLName; PL(n).GpsKP; PL(n).GpsE; PL(n).GpsN;
%DigitNum - number of digits after floating point for text/pline/circles;
%PLNameAttr=[PLName_Text_Size PLName_Text_Angle] - polylines names attributes; if PL is point, then draw circle using CircleAttr(1);
%CircleAttr=[Circles_Radius Circles_Draw_Modulio] - circles draw attributes;
%CircleNameAttr=[CircleName_Text_Size CircleName_Text_Angle CircleName_Draw_Modulio] - circles names attributes.
%Acad coordinates:
%^GpsN
%|
%o--->GpsE
%Example:
%PLXtf=gXtf000Dir2PLRead('c:\temp\SSS\3\','-b',[6378137 0.081819190842621],[0 141 0.9996 500000 0],[,],1,1);
%gMapPL2AcadExport('c:\temp\SSS\3\Cad\ ',PLXtf,[7 0],[5 100],[6 0 500],2,1);

if isa(fName,'double'), fId=fName;
elseif isa(fName,'char'),
    if fName(end)~='\ ',fId=fopen(fName,'w');gAcadZoom(fId,[0 0 0.0001],4);end;
else error('Error gMapPL2AcadExport: fName must be filename or dir-name or fId');
end;
for n=1:length(PL),
    if isa(fName,'char') && (fName(end)=='\ '),fId=fopen([fName '\ ' PL(n).PLName '.scr'],'w');gAcadZoom(fId,[0 0 0.0001],4);end;
    if flLayers, gAcadLayerMake(fId,PL(n).PLName);end;
    if ~isempty(PLNameAttr), gAcadText(fId,PL(n).GpsE(1),PL(n).GpsN(1),PLNameAttr(1),PLNameAttr(2),PL(n).PLName,[DigitNum
DigitNum]);end;
    if length(PL(n).GpsN)~=1, gAcadPline(fId,PL(n).GpsE,PL(n).GpsN,[DigitNum DigitNum]); else
gAcadCircle(fId,PL(n).GpsE,PL(n).GpsN,CircleAttr(1),[DigitNum DigitNum 0]);end;
    L=~mod(PL(n).GpsKP,CircleAttr(2));if ~isempty(L) && any(L),gAcadCircle(fId,PL(n).GpsE(L),PL(n).GpsN(L),CircleAttr(1),[DigitNum
DigitNum 0]);end;
    L=~mod(PL(n).GpsKP,CircleNameAttr(3));if
~isempty(L) && any(L),gAcadText(fId,PL(n).GpsE(L),PL(n).GpsN(L),CircleNameAttr(1),CircleNameAttr(2),PL(n).GpsKP(L),[DigitNum DigitNum
0]);end;
    if fName(end)=='\ ',fclose(fId);end;
end;
if isa(fName,'char') && (fName(end)~='\ '),fclose(fId);end;

%mail@ge0mlib.com 25/10/2017
```

Citation

- 1) Autodesk AutoCAD 2017 help.