

PCC Pictometry Electronic Field Study User Guide

Introduction

Pictometry Electronic Field Study (EFS) is a tool which utilises geo-referenced aerial photography to enable and assist a wide variety of users with numerous tasks. EFS uses more traditional 'straight down' orthophotography as well as 'side on' oblique images which are taken at an approximate 45° angle to the ground. Users may be familiar with this sort of imagery through the use of web browsers on the internet but Pictometry uses a series of complex algorithms to enable users to work with the images to measure height, distance, area and elevation, navigate, annotate imagery for a number of purposes and even search by address. EFS is a powerful tool for use in planning, asset and property management, emergency response, engineering and GIS.

Imagery can be used simply to view a site, to measure an area and can be incorporated into a report or presentation. Workspaces can be created so that users can view particular images which are used more often or to annotate places using icons, drawing tools or text.

Getting Started

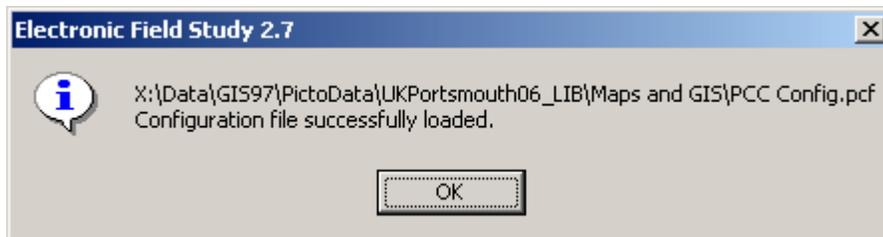
Launch the application from by clicking the EFS icon on the desktop:



Click **File – Open**. Change files of type to **Config Files (*.PCF)** and navigate to:

X:\Data\GIS97\PictoData\UKPortsmouth06_LIB\Maps and GIS

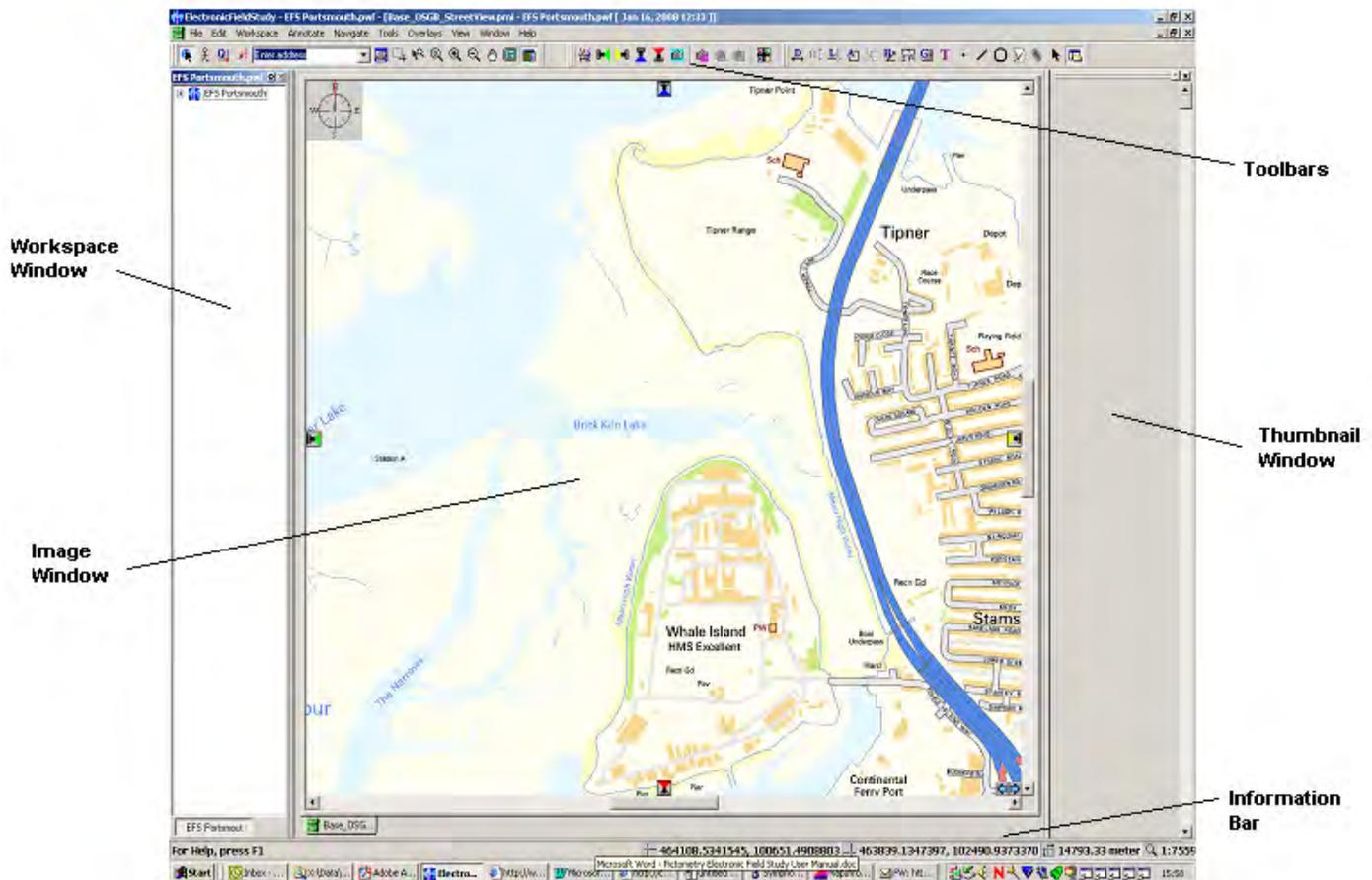
Double click on the **PCC Config.pcf** file and Pictometry will display the following message:



This configuration file holds all the information which Pictometry uses to set up the session for use at Portsmouth City Council and creates an optimum layout with all relevant tools available on the toolbar.

Click File – Open and open the workspace **EFS Portsmouth** from X:\Data\GIS97\PictoData\Licence.

The EFS session should now be composed of an image window displaying a map of Portsmouth with the workspace window on the left (displaying the workspace name and its tree), the thumbnail window (currently empty) on the right and various toolbars at the top.



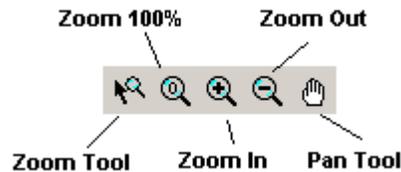
The EFS layout

Searching for images

One of the most common uses of Pictometry EFS is simply as a viewing tool. There are numerous way to navigate to the aerial images held in the image library.

Searching for images by clicking the map

If you know the location of the area of interest on the map then you can navigate to the relevant point on the map using the navigation tools in the toolbar:



The Zoom Tool can be used by clicking and holding down the left mouse button and dragging a box to select an area to fit the image window. Zoom In and Zoom Out increases or reduces the zoom level by 100% respectively and the Pan Tool can be used to navigate around the map by dragging and dropping by clicking and holding the left mouse button.

N.B. These tools can also be used to explore aerial images when open.

Once the location of the area of interest is in view on the map, select the Image Tool:



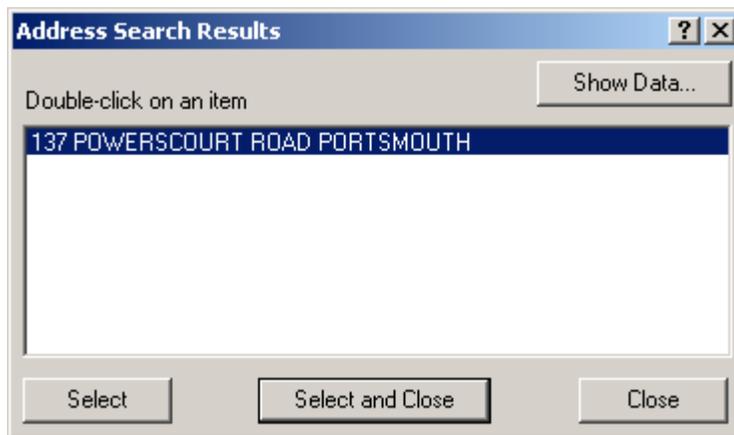
and click on the location of the point you wish to view. EFS will then search the image warehouse for all images in which the selected point appears. The best image is automatically displayed in the image window along with a red crosshair to show the point selected. (The crosshair can be repositioned at any point by reselecting the image tool and clicking at the desired point on the base map or an image). All of the images which contain this point are displayed in the thumbnail window with oblique images first and orthophotos towards the bottom. The direction of the view for each image is shown at the top of a compass next to each thumbnail. Any of the images from the thumbnail window can be opened by double clicking on the small image.

Searching for images by address

If you know the address of a property or location then it is possible to search for the location using the address search tool:



Partial text searches are most effective when using the address search as EFS searches several different fields from the Local Land and Property Gazetteer (LLPG). For example, when searching for 137 Powerscourt Road, North End, Portsmouth, it is only necessary to enter “**137 powers**” into the search box (exclude quotes). The search tool is not case sensitive and hitting enter will begin the search and EFS will display the results.



Any addresses that match the search will be displayed in the Address Search Results. The information for each of the returned addresses from the LLPG can be displayed by highlighting the address and clicking the **Show Data** button. Once the required property has been identified, highlight the address by clicking on it once and click **Select and Close**. The best image is automatically opened in the image window with a red crosshair on the selected property/location and all other images which contain the point are displayed in the thumbnail window. The crosshair is placed at ground level so it may be difficult to establish the correct property. Think of buildings and other objects above ground as transparent or change the viewing angle to better show the property.

For more information on how EFS selects the 'best' image from the images in the thumbnail window, see the Blom user manual.

Changing viewing angle in the image window

When an aerial image is open in the image window, four buttons appear at the top, bottom, left and right of the image which allow the user to change the viewing angle. Depending on the current viewing angle the buttons will be one of the following five:



By clicking these buttons, the user can change the viewing angle to show the point centred on the crosshair from a different view. Hovering over the buttons will identify the camera direction by changing the icon to N, S, E, or W and clicking the button will open an image to show the crosshair from any of these directions. Click on the camera icon (O) to display the orthophoto (from above) for the point.

- As each new image is opened it is added to the Opened Warehouse Images folder in the workspace window. This can be viewed by using the plus and minus buttons in the same way as windows explorer.
- The opened images can be seen as tabs at the bottom of the image window and these can be clicked on to recall any images. Only five images are

opened by EFS at a time, one of which is always the base map. As more images are opened, the last viewed images are closed.

Other views

- **Full Screen**

Click the Full Screen icon:



or select **View – Full Screen** to fill the whole screen with the image window. This can make viewing the image easier and the need to navigate around the image may be reduced. To exit click the Full Screen icon again.

- **Penta View**

Click on the Penta View icon:



to open five images centred on the crosshair from the north, south, east west and above, (it may take some time to load). This viewing tool is best used along with full screen mode which can be selected after clicking the Penta View icon. The four smaller images can be selected as the main image by clicking on any of the icons in the main window as before. To establish which images are from which direction, click on **PentaView – Show colour cones**. Hover over the smaller image windows and the direction of the camera will be displayed on the main image. To exit Penta View click on the x (close) button at the top right of any of the five windows.

Opening adjacent images

Images adjacent to the one in the image window can be opened in one of two ways. Firstly, the user can select **Navigate – Move one image to the north/south/east/west**. Another option however is to select the Navigate Tool:



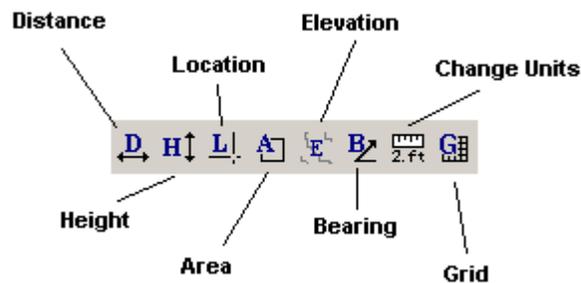
from the toolbar which can be used to measure distance along a route whilst automatically opening adjacent images. The navigate tool draws a line from the point of the crosshair so if the user wishes to move to an image east of the current one, clicking in the relevant direction will move the image accordingly. Click towards the edge of the image and wait until the image refreshes. The navigate tool can be used to move around an area and once the user has finished navigating, clicking on the Select Tool icon:



and clicking anywhere in the image window will delete the line.

Using EFS measurement tools

One of the most powerful facilities in EFS is the ability to measure real world distances and areas using the aerial images. Horizontal area measurement has long been possible using orthophotography but Pictometry's strength lies in the ability to measure height, distance, elevation above sea level, and vertical as well as horizontal area by using the 45° angle oblique images. The Navigate Tool was introduced in the last section and can be used not only to move from one image to another adjacent one, but to measure distance along a route. Distance and area is measured in meters and square metres by default. To change these settings click **Edit – Change Units** and select the required unit of measurement.



The Measurement Toolbar

The measuring tools are located on the toolbar at the top of the screen and can be used to extract a variety of real world information from the aerial photographs or the base map.

- **Distance Tool**

The distance tool can be used in the image window with both the base map and the oblique and orthophoto's. Distance can be measured by clicking and dragging the left mouse button from one point to another and then letting go. The line and the distance is then displayed in the image window. To change the unit of measurement click on the Change Units icon. The user can change the direction of a continuous line by pressing the 'V' key on the keyboard to insert a vertex. To measure distance along a freeform (hand drawn) line, keep the 'Alt' key depressed when clicking the left mouse button.

EFS aerial images have elevation data incorporated into them so that the height above sea level of a point at ground level is known. It is important to remember that elevation data represents ground level and not buildings or trees etc. The distance tool can take into account the changes in elevation which, whilst not overly apparent across most of Portsmouth, could have an effect when measuring distance over an area on, say, Portsdown Hill. To enable the "Walk the Earth" tool which takes into account changes in elevation make sure the distance tool is selected and click **Tools – Properties** and check the **Walk the Earth** box and the **Display as Distance** box.

- **Elevation Tool**

The Walk the Earth tool introduced in the previous section utilises the elevation data inherent in the Pictometry imagery. The elevation of a point can be displayed by selecting the elevation tool and clicking either an oblique or orthophoto. The height of the ground above sea level will be displayed in metres. To change the units of measurement, click **Edit – Change Units**. It is important to remember that the elevation data represents the ground level and not the height of buildings and trees. Think of tall objects such as these as transparent. When clicking on the roof of a tall building, the elevation tool displays the height of the ground behind the building. Elevation data can also be seen by holding the left mouse button down and moving around the image. The changing elevation will be displayed in the information bar at the bottom right hand side of the EFS session.

The elevation tool can also be used to calculate the difference in height of two different points by clicking the left mouse button on one point, holding down the **CTRL** button and moving to another point releasing the mouse and **CTRL** button. Changes in elevation are displayed as both positive and negative values depending on whether the elevation has dropped or increased.

- **Height Tool**

The height of buildings, trees, pylons and other objects in oblique imagery can be measured using the height tool. Select the height tool from the toolbar and navigate to the object to be measured. When measuring height it is important to remember to measure from the ground up and not vice versa. At the base of the object click and hold the left mouse button and drag the cursor to the top of the object and release the button. EFS draws a plumb line which does not deviate from the vertical and displays the height in metres. To change the unit of measurement for this tool select **Edit – Change Units** and select the desired measurement.

The height tool can also be used to measure the area of a buildings façade. Use the height tool as before by clicking the bottom corner of a building and dragging the cursor to the top of the building. Before letting go of the left mouse button press the **CTRL** button and drag the polygon to fit the side of the building. The area of the façade is displayed in square metres. The units can be changed in the usual way.

- **Area Tool**

The area tool can be used to measure both parallelogram and freeform areas on oblique and orthophotographs. Although measurement can be made in oblique imagery it is recommended that the areas are measured using orthophoto's to ensure better views and accuracy. The measurements can then be viewed in oblique images. To measure an area using a parallelogram, select the area tool and click and hold the left mouse button at one corner of the shape to be measured. Drag the cursor along an adjacent side to the next corner and whilst still holding the mouse button, press the **CTRL** key and drag the polygon

to the opposite corner to complete the parallelogram. Release the mouse and the **CTRL** key and the horizontal area is displayed in square metres.

To hand draw an area either press and hold the **ALT** key and hold the left mouse button down to trace an area manually or press the '**V**' key to insert a vertex. EFS will automatically complete the polygon when the mouse button is released.

- **Location Tool**

The location tool will display the X and Y co-ordinates of a point when clicking on the base map or an oblique or orthophoto.

- **Bearing Tool**

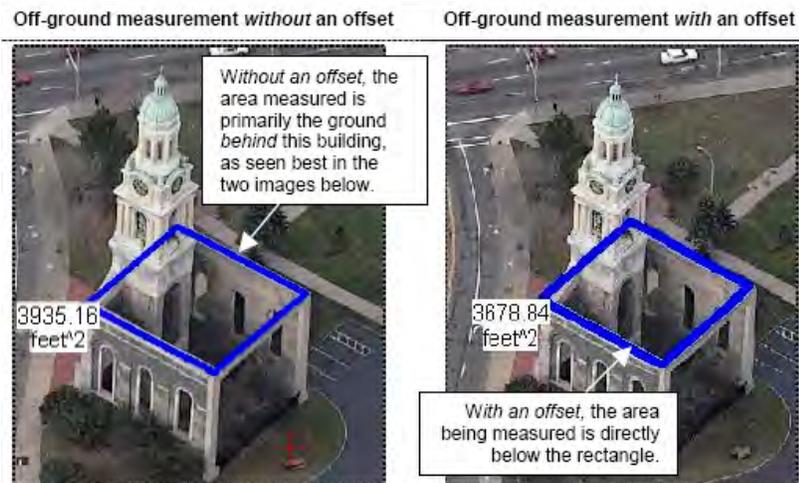
The bearing tool can be used to measure the bearing of a line relative to true north (0-360°) and can also be used to measure angles on the ground. To measure a bearing select the bearing tool and click and hold down the left mouse button on a point and then move the mouse to a point to find the bearing of the line from start to finish.

To measure the angle of an object select the bearing tool and click and hold the left mouse button on the vertex of the object. Move the cursor along one side of the object and press **CTRL**. Trace the next line along the other edge of the object and release the mouse button to display the angle.

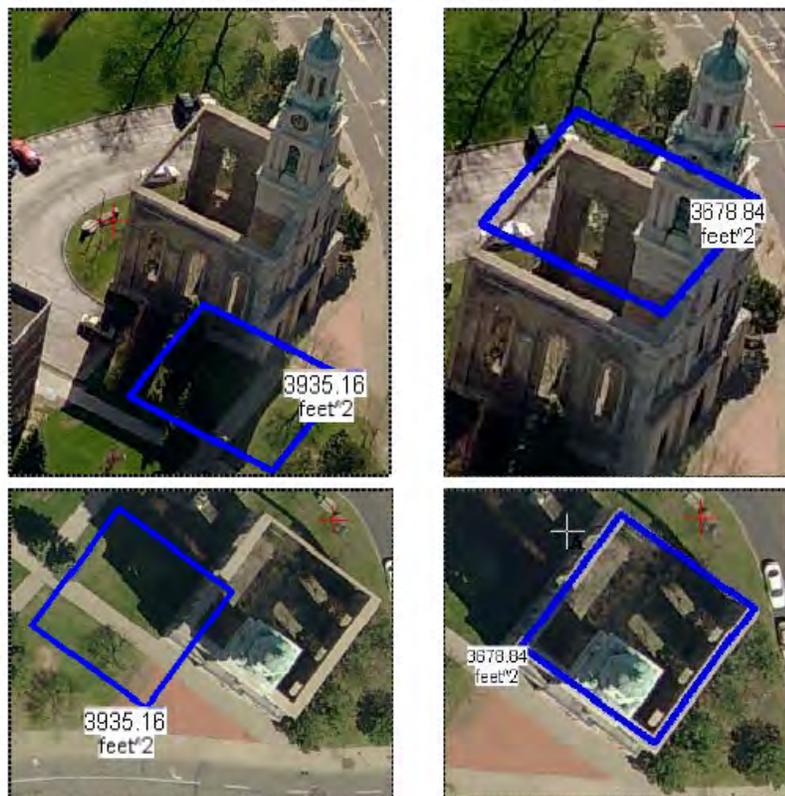


Ground Plane Offset

EFS carries out all of the measurements covered above relative to the ground plane using the elevation data held in the images. There may be instances where measurements need to be made above the ground plane either for the purposes of accuracy or presentation. When measuring the area of a roof of a building it is necessary to use a ground plane offset.



The images below show the measurements from other directions. (The Orthogonal images show precisely the "footprint" of the ground you measured.)



The ground plane offset tool raises the elevation at which the measurements are taken by a set height above the true ground level to give a more accurate

measurement and to enable the area measured to be viewed in its correct location from any angle. The ground offset is set before using any of the measurement tools. Select the tool to be used and then press the 'O' key on the keyboard and a green box prompting you to **Set Ground Plane Offset** will appear in the top right hand corner of the image window. If you wish to measure the area of the top of a building that is 60 metres high then the ground plane must be offset by that height. Use the building to set the height by clicking and dragging the mouse from a bottom corner to the height of the roof. All measurement and annotation is now taking place at the height which has been specified. All subsequent measurements are made using this offset and it will be shown in the green bubble in the top right hand corner. To reinstate the 'true' ground plane, press the 'G' key.

Measurement tool output and annotation

Up until now measurements have been displayed on the EFS aerial images and base map temporarily, removed either by clicking the image with the Select Tool or by carrying out another measurement. The user may require these measurements to be made permanent for the purposes of presentation, reporting or creating annotated workspaces. If this is the case, select the tool required and click **Tools – Properties**, check the **Draw Permanent Lines** button and check the **Draw Associated Text** box. Now, when the area tool is used to measure an area/distance, EFS launches the **Annotation Layer Properties** window and the user can define the style of the annotation in the **Annotation Layer** tab. The user can also name the annotation layer which will contain the line/text output in the workspace window by clicking the **Adv. Attributes** tab.

Once the measurement has been made and the attributes for the annotation layer have been set, the name of the attribute layer is displayed in the workspace window. Clicking the '+' symbol allows the user to see the line and text files which make up the layer. These can be manipulated by right clicking on the file and selecting properties. Here, line width and colour can be changed and zoom level can be selected to suit the desired view.

Clicking the **Adv. Attributes** tab enables the user to set the zoom level for the annotation. If the user wishes the line and text of the annotation to remain the same regardless of zoom level then the box **Do Not Scale** should be checked. This means that the annotation can be clearly seen regardless of the level of zoom. If, however, there are several annotations, the image can soon become cluttered using this setting and so **Scale by Zoom Factor** should be checked. This setting changes the size of the text and lines in accordance with the zoom level so that they always cover the same 'footprint' on the image.

Annotating Images

We've seen how measurement tools can be used to permanently annotate aerial images in EFS but there are other tools which can be utilised to label photography for a number of purposes. Icons, links, text and lines can be added to an image to mark things of interest in a n image. To add annotations to an image click **Annotation – Create New Annotation Layer** and name the layer in the **Adv. Attributes** tab in the **Layer:** box.

- **Add an Icon Annotation**

To place an icon on to the aerial image click on the Icon Annotation Tool:



or click **Tools – Icon Annotation Tool**. Click on the point where you wish to place the icon (remember to use a ground plane offset if the icon is to be placed off the ground at the top of a pylon or building etc.), and the select icon box is displayed. If no icons appear in the window then click **Load New Icon** and select a relevant graphic.

The Icon Annotation Properties dialogue box appears where text to label the icon can be added. Click the **Adv. Attributes** tab where the zoom scaling can be set as well as the annotation layer to which the icon will be added. The locale can be changed to Global if the user requires the annotation to appear in all aerial images or Local if the image need only appear when the current aerial photograph is used.

Multiple annotation layers can be created using this process. Each layer's visibility can be switched on an doff by checking or un-checking the tickbox in the workspace window.

- **Adding a Line Annotation**

To place a line annotation on the image click on the Line Tool:



or click **Tools – Line Annotation Tool**. If the user wishes to draw a closed line (square/polygon) select **Tools – Properties** and check the box **Automatically close line annotation**. If the line does not need to be closed then the box should be left unchecked.

The line annotation can be drawn using the same methods as explored earlier by pressing the '**V**' key to add a vertex, holding down the **ALT** key to draw a freeform line or pressing the **CTRL** key to draw a polygon.

The properties of the annotation can be changed by right clicking on the annotation in the workspace window and clicking on **Properties for....** If there

are multiple annotation layers open, the line can be placed in the correct layer by right clicking on the line in the workspace window, selecting **Properties for...** and clicking the **Adv. Attributes** tab and selecting the relevant annotation layer from the drop down menu.

Remember that the ground offset tool can be used for annotations as well as measuring. Make sure it has been switched off if no offset is needed or changed if an offset is required.

- **Adding a Circle Annotation**

To place a circle annotation on the image click on the Circle Annotation Tool:



or click **Tools – Circle Annotation Tool**. The annotation can be made global or local by selecting **Properties** from the **Tools** menu when the circle annotation tool has been selected.

To add a circular annotation click and hold the left mouse button on the point where you want the circle to be centred and drag the mouse to the desired size. If you know the exact radius or centre point of the circle these can be entered manually by right clicking on the circle's file in the workspace window, selecting **Properties for...** and clicking on the **Recalculate Circle** tab. When drawing a circular annotation, the line takes into account the elevation data in the imagery and fits the circle accordingly.

- **Adding a Text Annotation**

To place a text annotation on an image click the Text Annotation Tool:



or click **Tools – Text Annotation Tool**. The style and properties of the annotation can be changed using the processes outlined above and the text can be placed over the image as a box or as a word bubble pointing to the area clicked.

The text annotation, as with all other annotations, can be moved around the image by clicking on the select tool:



and dragging and dropping the object.

Creating and Saving Workspaces

Users can create annotations and measurements using the EFS Portsmouth workspace as a starting point and then simply save these annotations in their own workspace for future use by clicking **File – Save workspace as** and saving the workspace either locally or on a network (not the X: drive). The workspace can then be reopened at any point and the annotation can be viewed by expanding the files in the workspace window and right clicking on an annotation and clicking **Go to...** .

The workspace will launch aerial images with the annotations.

Exporting and Printing Images

Users may require printed images or may need images from Pictometry to be placed in reports, presentations etc, and EFS allows users to extract whole image tiles or portions of an image to a number of formats.

- **Exporting part of an image**

To export a portion of the aerial image to jpeg select the extract tool:



or click **Tools – Extract Tool**. Hold down the left mouse button and drag the cursor to cover the area required for exporting. Release the mouse button when happy with the area selected and the **Export Image** window opens. Select the required file type (use JFIF – JPEG if unsure which to use) and check the **Include all currently enabled overlays** box if the annotations are to be included on the exported image. If not, make sure the box is unchecked. Similarly, check the next box if a compass is required on the image.

Click **OK** and browse to the folder where the image is to be placed.

Click **OK**.

- **Exporting a whole image tile**

To export the entire aerial image (i.e. the whole photograph, not just the part shown in the image window) click **File – Export Image**. The **Export Image** window opens. Select the file type and make sure the **Use Image Size** button is checked. Set all other parameters as required and click **OK** and browse to the folder in which the image is to be placed.

Click **OK**.

- **Printing an Image**

Click **File – Print Setup**. Set the required page size and layout for the print and select the printer if not already selected by default. The check boxes in the Image section of the Print Setup window control various information and layouts on the printed output. Experiment with these boxes and click **File – Print Image Preview** to see how the final output is affected.

Pictometry MapInfo Plug-In

If you are a MapInfo Professional user, a plug-in can be installed onto MapInfo to allow you to view Pictometry images by clicking on a map. A Pictometry toolbar is added to the MapInfo session and selecting the Pictometry icon:



and clicking on the map will launch a Pictometry image with a crosshair on the point selected. Some navigation and measurement tools are available with the plug in. For more information, launch the plug-in and click on the help icon:



Additional Tools and Information

The main uses and functions of Pictometry EFS are covered in this short user guide. There are other functions and tools available within the software which users may wish to explore. The 550 page EFS User Manual is available for those wishing to further explore these tools as well as exercises and tutorials produced by Blom available at:

X:\Data\GIS97\PictoData\EFS Training Material