

# iAntConfig version 0 functional user guide

4 March 2009

Mattieu de Villiers

The purpose of this document is to provide a functional description on how to use iAntConfig, the Macintosh version of AntConfig. iAntConfig is designed for use on a MacBook Pro running OSX Leopard, but a desktop Mac can also be used that has a suitable mouse with a trackball for scrolling both horizontally and vertically.

As an introduction, AntConfig started off as a Windows application which is now discontinued. The new simulation core is AntConfigServer which runs on Linux or Mac. Matlab example scripts (which could be translated into Python, etc) can automate AntConfigServer as it gives transparent access to outputs and input variables in a programmatic fashion. An older version of AntConfigServer is available to users upon request from the author (email mattieu@ska.ac.za). Be warned that there are developments in progress so definitions, functionality and interfaces keep changing. The latest version of AntConfigServer is not documented and will not be distributed until these developments have stabilized.

iAntConfig is purely an interface for (the latest version of) AntConfigServer, however it adds some powerful design management features. Some other functions such as the ordering of antennas is supported in iAntConfig and scripts to perform the same task can only be written by an experienced user in AntConfigServer. iAntConfig is still being developed in an ongoing basis, however it is sufficiently capable at the moment to be useful, which is why it is released at this point. Please bear with the work in progress.

## At a glance

The layout of the interface is highly reconfigurable to allow you to compare things that you want to see side by side. To start off, however, only the simplest scenario is considered. Please refer to figure 1. Some items that are labeled in the figure are described below.

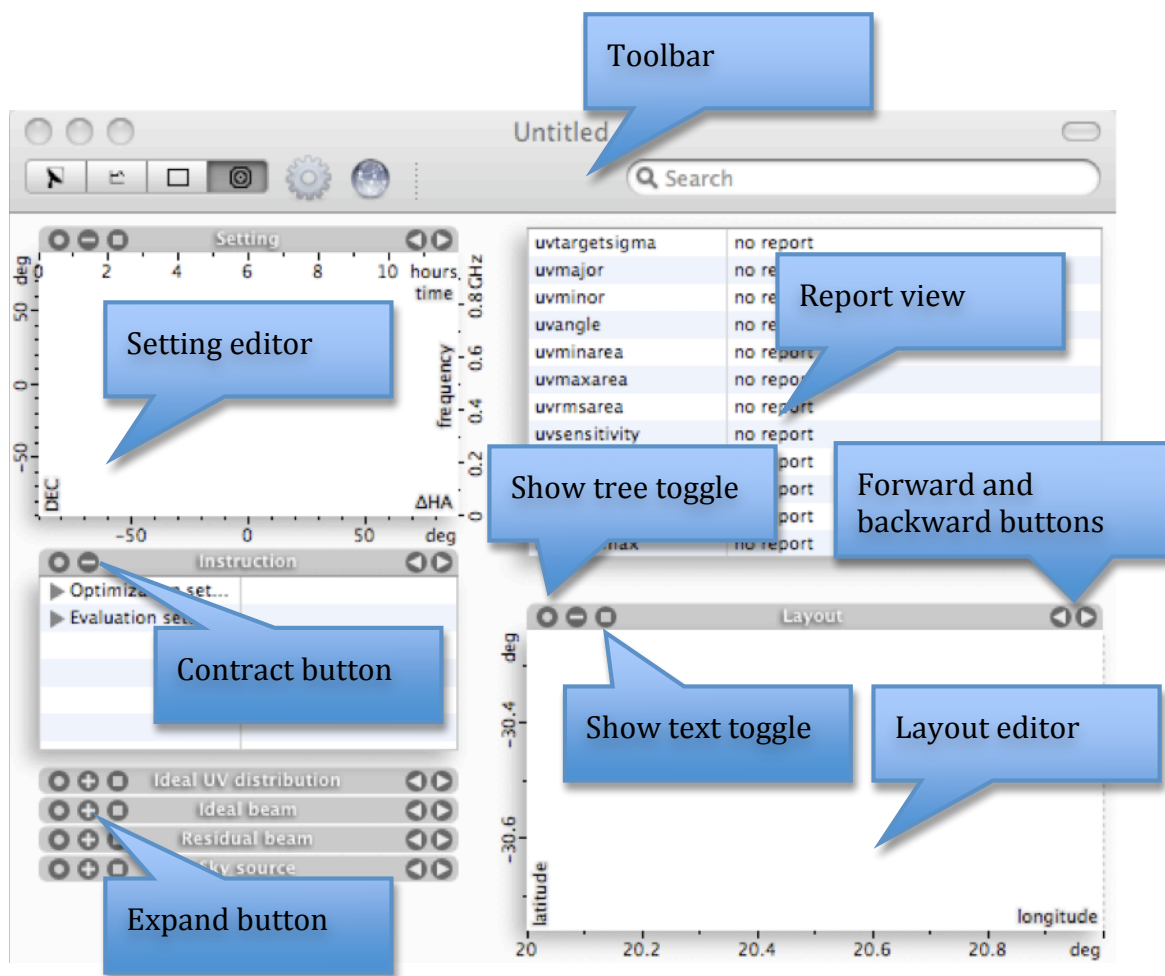
**Toolbar** and also the application menu bar should be ignored in this version.

**Other things to ignore:** the sky source master view; also missing displays for the ideal beam and residual master views.

**Setting editor:** This view provides a graphical representation of the observation settings. It also allows the user to specify and modify the observation settings interactively. To create a new setting initially, double click in the view at a suitable declination, hour angle coordinate. Thereafter dragging hotspot areas (cues you by a changing mouse cursor) allow you to manipulate the setting. Settings can be imported or exported by right-clicking the setting editor.

**Layout editor:** This view provides a visual display of the layout and allows for interactive editing of the layout. To add a new antenna to the layout, double click inside this view. Drag to select multiple layouts. Use Apple or Shift key modifiers

to add/remove antennas to the selection. Note that you can pan and zoom while dragging a selection rectangle or circle. The groups of antennas can be moved, scaled, rotated, or scaled nonlinearly by a power law, or twirled by manipulations using the mouse (the latter two is achieved by first clicking onto the selection circle so that its center cross extends to the circle boundary). You can also copy selections and scale and rotate them to create log spirals, or using a linear offset, you can create linear arrays. To do this you must drag the selection circle or the center marker of the circle. Note you can move the origin or center marker of the circle by holding the apple key down while clicking. A layout can be imported or exported (same formats as described in documentation for AntConfigServer) by right-clicking the layout editor.



**Figure 1:** start up screen

**Report view:** The report view displays a summary of numerical simulation results. This view is associated with the instruction editor view.

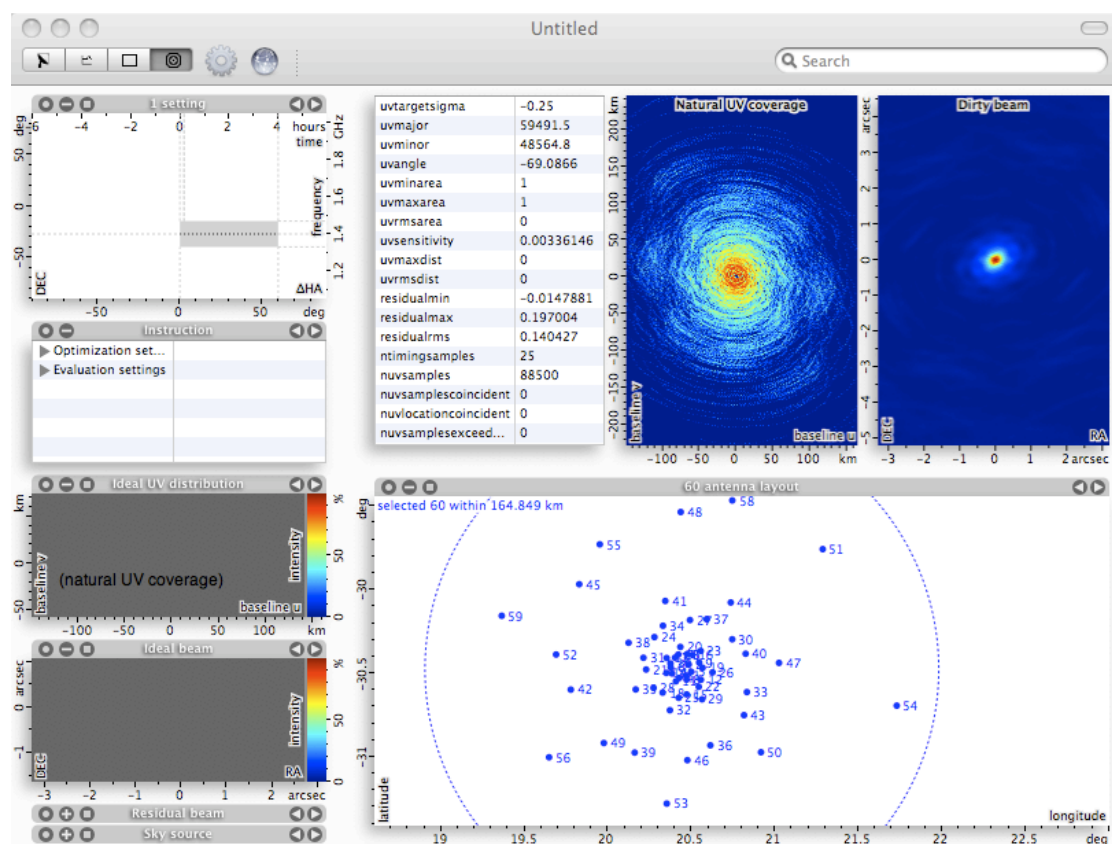
**Contract and expand buttons:** these buttons collapse or expand the views with which they are associated. Only editor views have these buttons. Most editor views ('instruction', 'ideal uv distribution', 'ideal beam', 'residual beam', 'sky

source' but not 'setting' and 'layout') have associated result views (displayed next to the report) that expand or collapse with the editor view. In figure 1 the 'Report view' is shown only because the 'instruction' editor view is expanded.

**Show text toggle buttons:** these buttons toggle between a text table and graphical representation of the view. This allows a more precise specification of a layout or setting.

**Forward and backward buttons:** these buttons allow you to move backward or forward through the history (tree) of items you have created by manipulating the editor views. A separate history (tree) is kept for each class of editor.

**Show tree toggle buttons:** shows the tree that stores the items created by each manipulation of the editor view.



**Figure 2:** Some simulation

**Editor/Master views:** The views on the left hand side and also across the bottom are master (or editor) views. These views represent some sort of input into the simulator. In figure 1 this includes the expanded views with titles: 'setting', 'instruction', 'layout', and also the collapsed views showing only the title bars 'ideal uv distribution', 'ideal beam', 'residual beam' and 'sky source'.

**Column master views:** In figure 1 this is the view with title bar 'setting'. It is the first view (or series of views of the same class).

**Row master views:** In figure 1 this is the view with the title bar 'layout'. It is the view (or series of views) displayed along the bottom across the main window.

**Rearrange master views:** The views can be swapped by dragging the one title bar onto another. You can also for example choose to make the 'ideal uv distribution' editor a row or column master.

**Panning:** To pan the contents of a view scroll using two fingers on the track pad (or the mousewheel, or trackball on the mouse).

**Zooming:** To zoom the contents of a view, press the **function** key while scrolling using two fingers on the track pad.

**Changing contrast of image views:** pan or zoom the colour bar of the corresponding master view. The 'Ideal UV distribution', 'Ideal beam', and 'Residual' master views have colour bars. The brightness/contrast of the corresponding result views will be adjusted accordingly.

**Changing the perspective of a tree:** A tree can be panned and zoomed as expected. Take care though not to zoom in above the horizon (ie point the mouse above the horizon while zooming) else the tree will become lost visually (must still sort this out). In addition, the perspective or viewing angle can be changed by holding the shift key down while scrolling. Holding down the alt key helps separating the farther away items.

**Naming items:** all instances of items you create such as the layouts or settings can be named by double clicking the titlebar of the editor and then entering a name.

**Setting an ideal distribution:** By default the natural uv distribution is displayed. You can specify an ideal UV distribution by double clicking onto the 'Ideal UV distribution' editor and then dragging the dotted line contours. You can also press the text toggle where you can specify minimum and maximum baselines or edit the values numerically. Weighting of the UV samples will be performed to achieve a close match to the ideal distribution. Changes in uvsensitivity and residuals can be observed in the report.

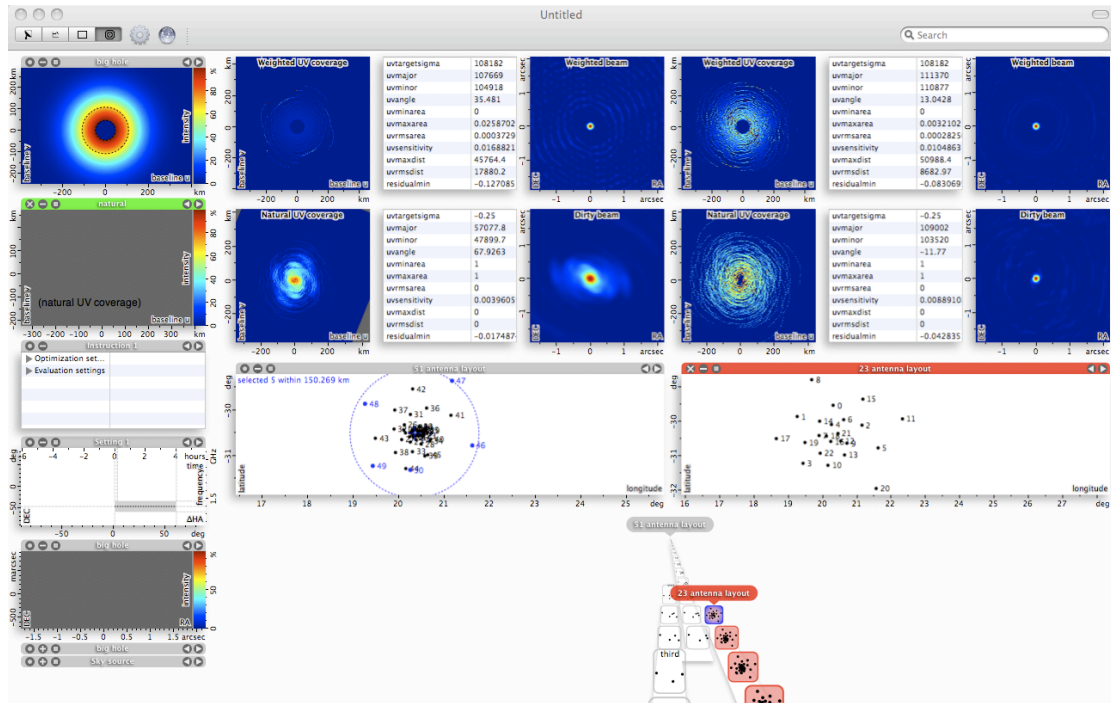
**Optimization:** Optimization of a layout can be performed by right clicking a resultant weighted UV distribution image.

**Ordering antennas:** Ordering of antennas can be performed by right clicking a resultant weighted UV distribution image. You may want to press the text toggle button, then select the last few antennas in the list, press the text toggle button again to return to the graphical display, then delete or disable the selected antennas (right click for options only supported in graphical view currently).

**Colouring items:** all items can be coloured. To do this you must first make the tree of the item visible by clicking the toggle tree button for the appropriate editor view. By colouring an item, iAntConfig will automatically display a list of the different coloured items if the editor for that item is a row or column master. See figure 3.

**Selecting items in a tree:** you can select all the direct descendants of a node by double clicking the node. You can select all descendants of a node by triple clicking the node.

**Rearranging items in a tree:** items in a tree can be rearranged by first selecting items and then dragging them to a new parent node. Items can also be deleted. By right clicking and choosing this option.



**Figure 3:** Demonstrating two ideal distributions versus two layouts for the same settings.

**Regional constraints:** To load a region (ESRI shapefile containing an ESRI polygon) right click the layout editor and choose this option. To constrain a layout to the region, right click the layout editor and choose the apply constraint option. Note that, unfortunately there is no automatic scroll and zoom and you will have to scroll to where the region is on your own to see it. Sorry about this, I will look into this shortly. The example shapefile provided is 26 degrees South, 26 degrees east, so zoom out first to find it.