UCT

# AMS Manual

Version 1


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# Contents

# 1. Getting Started

Before you can start testing the antennas and plotting their polar diagrams, you first need to install the required software.

## Installing the software

If you have already installed the software, please jump to section 2.

1. Download https://s3.amazonaws.com/ThinkRF/Support-Resources/pyrf-dependencies.zip

2. Extract the contents of the zipped file

3. Install Python 2.7.9 (includes pip)

4. Add the following to the windows PATH: ';C:Python27;C:Python27Scripts'

> Note: Windows does not automatically add python to its environmental path. This will allow you to call python from the command line.

To add files to path:

> Start the System Control Panel applet (Start - Settings - Control Panel - System).
>
> Select the Advanced tab.
>
> Click the Environment Variables button.
>
> Under System Variables, select Path, then click Edit.
>
> You'll see a list of folders, as this example for my system shows:

C:\Program Files\Windows ResourceKits\Tools\;%SystemRoot%\system32;%SystemRoot%; %SystemRoot%\System32\Wbem; C:\Program Files\Support Tools\;C:\Program Files\Common Files\Ulead Systems\MPEG;C:\Program Files\Intel\DMIX;C:\Program Files\Executive Software\Diskeeper\; C:\Program Files\Misc

> Click OK.
>
> You'll need to restart the processes (e.g., command prompt) that use the system path to see the added folders.

5. Install the following (all found within the zip):

> Numpy (numpy-1.8.1-win32-superpack-python2.7)
>
> zope.interface (zope.interface-4.1.1.win32-py2.7)
>
> twisted (Twisted-14.0.0.win32-py2.7)
>
> pywin32 (pywin32-219.win32-py2.7)
>
> netifaces (netifaces-0.10.4.win32-py2.7)

6. Using a command line, go to the setuptools-5.7 folder and type 'setup.py install' - Can do by clicking setup.py

> Note: You might need to manually add the pyRF file (included) into the lib directory within the python directory

# 2. Using the System

Once all the necessary software has been installed, we can go ahead and plot antenna patterns.

## System Checks

Before running the program, we need to make sure that all the connections are working. We need to check that the serial to USB cable is working as well as checking to see if we can communicate with the ThinkRF device itself.

The process has been simplified so that we can simply run a single file to do these checks.

Run "ports" batch file to get the port number of the serial connecter as well as the IP address of the WSA5000. What this does is pings the COM ports and returns which devices are connected to which ports and then it pings for the MAC address of the ThinkRF and returns the IP using reverse lookup.

> NOTE: In order to ping the ThinkRF, we need to ping thinkrf.uct.spacemesh.net when on the UCT network. This is done automatically when running the ports file.

Once we know the IP of the ThinkRF, we can try running the python script to ensure that everything is working as expected before running the complete thing. To do this, we go to the system terminal. This can be easily done by pressing shift + right click, open command prompt.

In the system command terminal, enter the full path for the python script with the 3 input arguments.

> eg: C:\Users\stevo_000\Desktop\ThinkRF\AMS_Antennas\IP-Freq-File.py 137.158.131.247 1.3 test
>
> NOTE: Sometimes the terminal might require you to have the python script in the C: root directory before it will be properly called from the meade program.

This script takes in 3 arguments, namely: IP, Freq, File (as per file name)

> IP: Provide the IP for the WSA5000 (eg 137.258.131.247)
>
> Freq: Provide the WSA with a centre frequency in GHz (eg 1.3)
>
> File: Give a file name (eg Test)

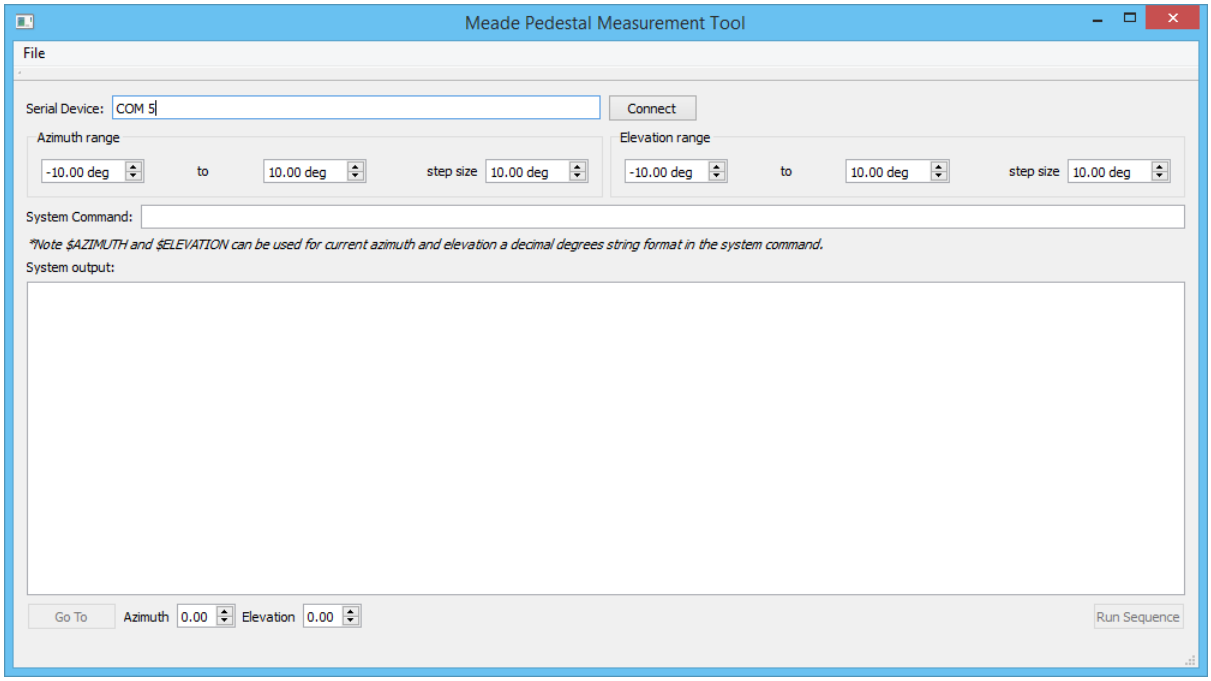
If the script runs with no issues, we can move to the next step.

## Testing an Antenna

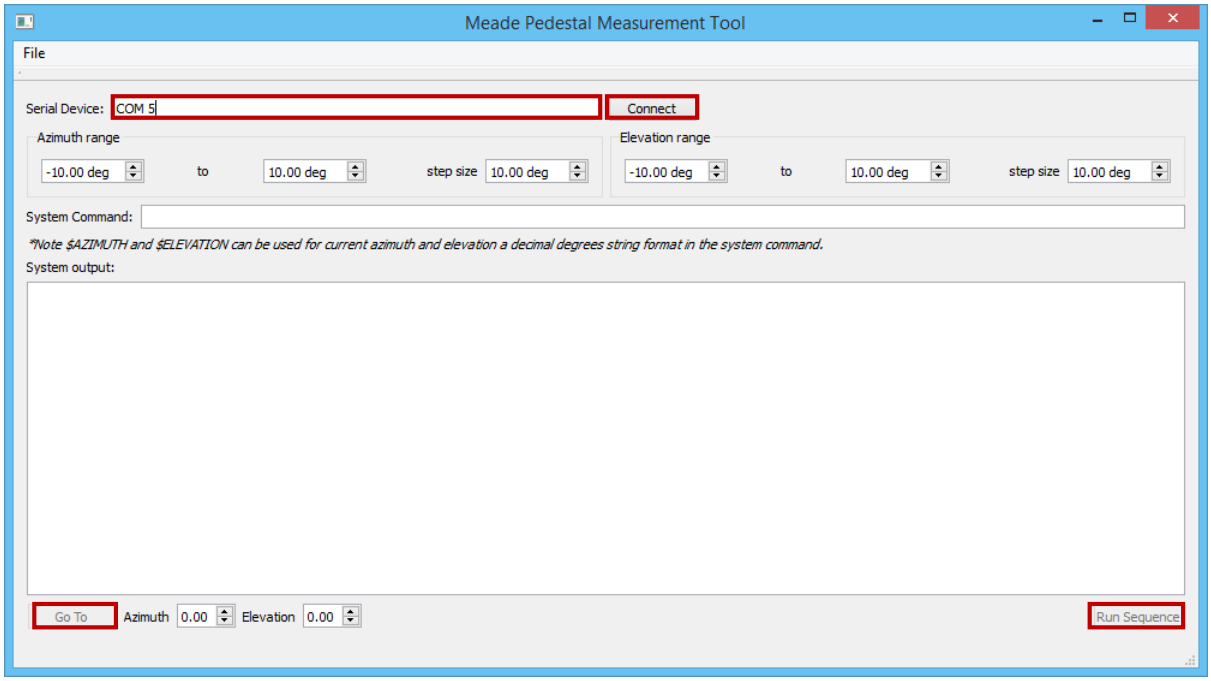
To test an antenna, we need to run the program:

"MeadePedestalMeasurementTool_win32_10-04-2015"

The program will open as follows:




Enter the port number as indicated by running the “ports.bat” file shown below and click connect:

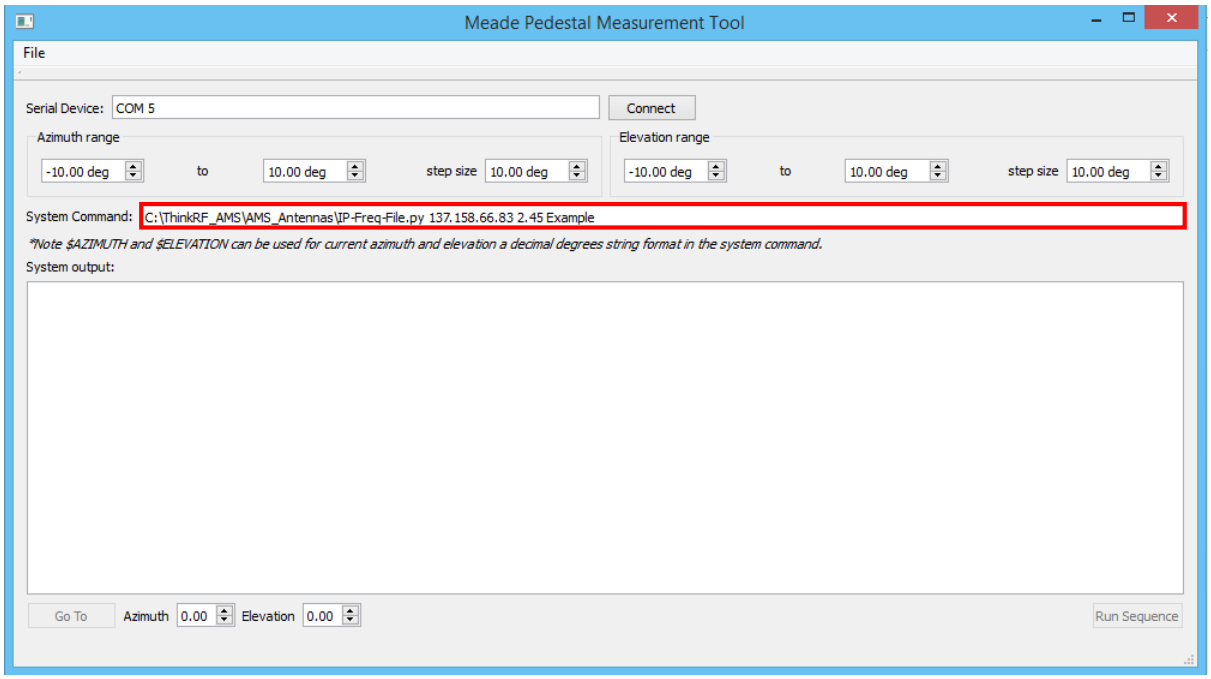



Once connected, the “Run Sequence” and “Go To” buttons will become available. This shows that the system is connected correctly.

We then need to enter the full path for the python script with the 3 input arguments into the “System Command” block as shown below.

eg: C:\ThinkRF\AMS_Antennas\IP-Freq-File.py 137.158.66.83 2.45 Example

NOTE: Sometimes the terminal might require you to have the python script in the C: root directory before it will be properly called from the meade program.




This script takes in 3 arguments, namely: IP, Freq, File (as per file name)

IP: Provide the IP for the WSA5000 (eg 137.158.66.83)

Freq: Provide the WSA with a centre frequency in GHz (eg 2.45)

File: Give a file name (eg Example)

We can then set the range that you want the scan to be and run and the step size that we want to use.

If you want to use the Matlab script that was written for this system, it is important to ensure that the step size is chosen such that is a factor of 360 degrees (eg. 1,2,3,4,5 degrees) . This is a constraint with regards to the specific script that I have written. Obviously for higher resolution measurements, 1 degree increments would perform best however, just note that each step takes approximately 15 seconds to complete. This results in a full 360 degree reading in 1 degree steps to take just over an hour to complete.

The system will beep once every time it completes a reading and increments a step. Each time a reading is taken, the output of the reading is shown in the “System Output” window.

All data is saved in the text file in csv form for easy editing in matlab etc.