**Software/User Guide - Investigating Horizontal Neutral Winds using Scanning Doppler Imaging and All Sky Cameras**

**Prerequisites**

Open MATLAB and download the following toolboxes from the AddsOn menu in the MATLAB editor:

* Signal processing Toolbox
* Phased Array System Toolbox
* Image Processing Toolbox
* Mapping Toolbox

If you are using Anaconda for Python, open “Anaconda Powershell Prompt” and install the following Python modules using “pip install <module name>”:

* SciPy
* MoviePy

**Reproducing Results**

Open MATLAB and open FPImain.m. Make sure to change the “cd” into your own directory of where FPI-winds\FPImain.m is saved. Press the run button under the editor tab. A dialogue statement will pop up into the command window asking :

* Please choose directory of SCANDI file with (.txt) format:

Enter the directory of the windift file, for example, “KHO-19-20Feb2014-ASC-SCANDI\WNM14219\_windfit.txt”. Make sure to include the directory within speech marks and add the .txt extension. Press enter. Another dialogue statement will pop up into the command window asking:

* Please choose directory of ASC folder:

Enter the directory of the ASC folder containing all the pictures for a given date. For example, “KHO-19-20Feb2014-ASC-SCANDI\KHO\_19Feb2014-ASC”. Press enter. The function should now be running and it should take between 2 to 6 minutes to completely execute.

When the execution is over, the a SCANDI video file named trial1.mp4 and an ASC video file named trial2.mp4 will be saved in inside the FPI-wind directory.

Now open a Python editor, for example Visual Studio. Open comb\_vids.py from FPI-winds. Press the run button and a dialogue should open in a command window asking:

* Please specify SCANDI video file path as .mp4 (DO NOT INCLUDE SPEECH MARKS AROUND PATH):

Enter the path of trial1.mp4 as the SCANDI video. For example, you would enter:

C:\Users\user\OneDrive - University College London\Rifat's PC\Internship 2021\FPI\FPI-Winds\trial1.mp4

This should not be included in speech marks. Press enter. Another dialogue statement should pop up in the command line asking:

* Please specify ASC video file path as .mp4 (DO NOT INCLUDE SPEECH MARKS AROUND PATH):

Enter the path of trial2.mp4 as the ASC video. For example, you would enter:

C:\Users\user\OneDrive - University College London\Rifat's PC\Internship 2021\FPI\FPI-Winds\trial2.mp4

This should not be included in speech marks. Press enter. This should now run the entire function and it should take around 1 to 3 minutes.

This should output the final video as a combined video of the superposition between the SCANDI video and the ASC video. This will be saved in the FPI-winds directory named as fulTrial.mp4.