**README**—Doppler Lidar and Remote Sensing—an interactive introduction

-All data files and matlab scripts are contained in a folder named “Doppler and Remote Sens- interactive intro”. Please copy this entire folder and place somewhere on the computers that are to be used by students and faculty during the daily activities. Inside this folder, the information has been organized into the following folders: “Day1”, “Day2”, and “Day3”. Inside each of these folders, you will find either one or two folders, one for each Doppler lidar system used to acquire the data in this module. These folders are named “Streamline” and “Streamline Pro”. Inside each “Day” folder, you will also find the power point presentation that is to be used on that day. The majority of the activities will involve data and matlab files in the “Streamline Pro” folders.

-The data that we are using for this module has been given a classification that depends on when the data was acquired last summer in NYC during a measurement campaign. Pre heat wave data was acquired before pre-defined heat wave conditions were present. Heat wave data was acquired during times that qualified as heat wave conditions. Post heat wave data was acquired after heat wave conditions subsided. We will introduce pre heat wave data on Day1, heat wave data on Day2, and post heat wave data on Day3. Students can compare data from all three days.

**Day1**

-Inside the “Streamline Pro” folder, you will find another folder called “pre HW”. This stands for “pre heat wave data”. Inside this folder, you will find two more folders—“pro\_soft” and “stream\_soft”. These folders contain the matlab scripts and the Doppler lidar data that will be used during the activities. The primary scripts that we will use during the module are in the “pro\_soft” folder.

-To begin exploring the data, students and faculty will be instructed to run the “analysis\_profile.m” file in the “pro\_soft” folder. When run, this file asks the user to select an input file from a list of files. The script automatically opens the “data” folder within the “pro\_soft” folder to access the data files. The user is to select one of the “User1” files as input to “analysis\_profile.m”. There is also “Stare” data present in the “data” folder but this file type is not an acceptable input to “analysis\_profile.m”. The output of “analysis\_profile.m” is a series of vertical profiles that convey information about wind speed, direction, and turbulence features.

-To explore the inner workings of “analysis\_profile.m”, the user will be instructed to enter the “data” folder and run a matlab script called “Streamline\_Pro\_application2.m”. When this file is run, it will prompt the user to select a file from the same list they selected from when running “analysis\_profile.m”. In fact, the user should select the same file so that they can experience the same data in a different way. After the input file has been selected, the user will be prompted to enter the elevation angle of the data that they would like to examine, 70 degrees or 80 degrees. After a selection has been made, the user will be prompted to select an azimuthal axis along which they would like to examine the data. For a definition of azimuthal axis, please see the “Def\_of\_Az\_Axis.jpg” file that is located in the “Doppler and Remote Sens- interactive intro” folder. After a selection has been made, the output plot is generated and consists of: on the far left, a profile of radial wind speed along one direction of the azimuthal axis; on the far right, a profile of radial wind speed in the opposite direction along the same azimuthal axis; and in the middle, a 3D schematic of the lidar beams that define the azimuthal axis. After this output is generated, the user is asked if they would like to continue. If not, the program is terminated. If yes, they will be prompted to input the new desired elevation angle and azimuthal axis.

**Day2**

-This folder contains both a “Streamline” and a “Streamline Pro” folder. The activities will be run the exact same way as in Day1, just now the matlab files and data files are in a folder called “HW” for heat wave data.

-Our matlab scripts for plotting the data that comes from our Streamline system are currently not very user friendly. For this reason, we only provide pre-processed data, in the form of plots of lidar scans. These images are located within the “Streamline” folder, and then within the “HW” folder.

**Day3**

-A new data set is introduced in the “Streamline Pro” folder, this time in a folder called “post HW”. The procedure for the activities are the same as Day1 and Day2.