The radarExplorer software is to simulate the measured backscattered signal from simple point scatterers. Additionally, the software can be used to explore the use of the FFT, and the effects of windowing and zero-padding data.

The software has 8 main sections, ***Sensor Parameters, Radar Channels, FFT Settings, Noise, Compute*** (button), ***Target Parameters, Axis Range,*** and the ***Senor*** and ***Target Position*** graph.

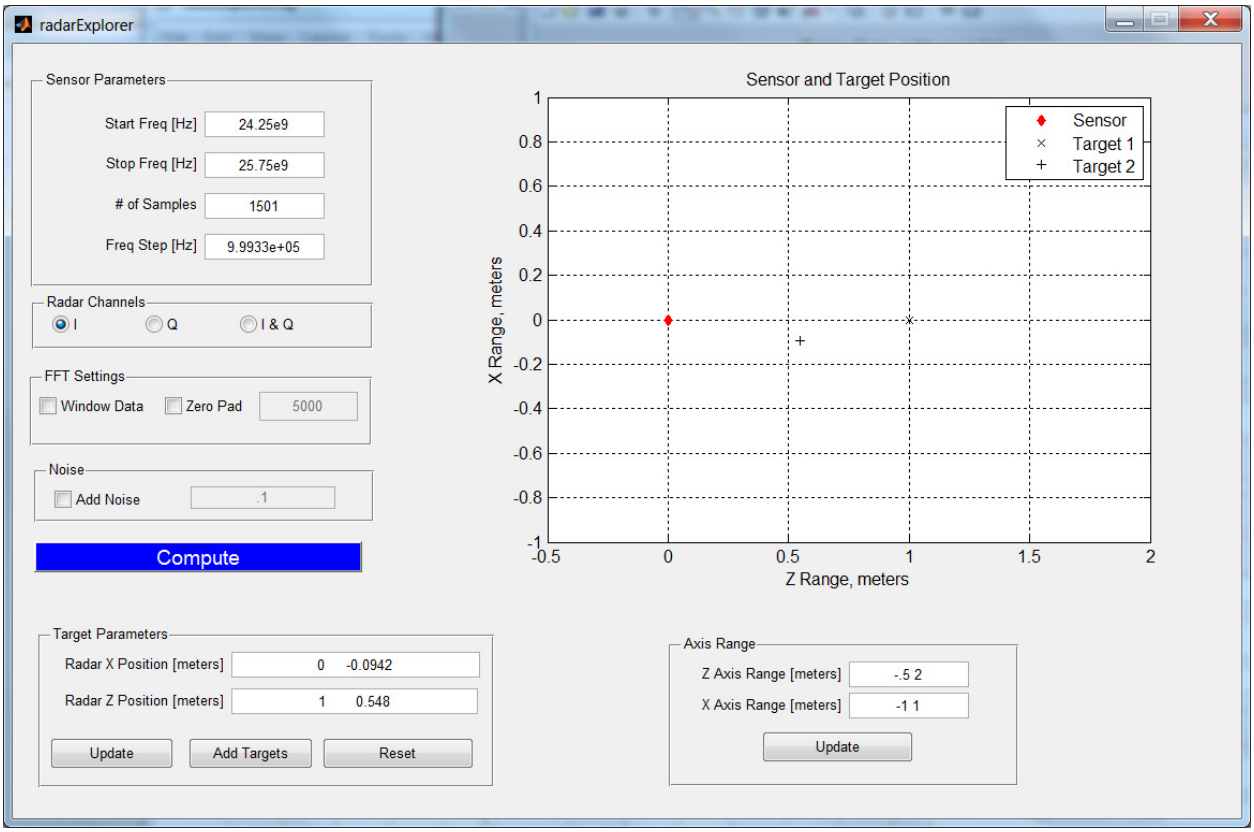

Figure 1 Screenshot of Radar Explorer software.

In the ***Sensor Parameters*** section, the sets the start and stop frequency in Hz, and the number of samples. The frequency step size is automatically calculated and cannot be set by the user.

In the ***Radar Channels*** section, the user selects how many output channels the radar sensor is using. The options are ***I***, ***Q*** or ***I&Q***.

In the ***FFT*** Settings section, the user has two choices, ***Window Data*** and ***Zero Pad*** data. If the ***Window Data*** option is selected the Hanning window will be applied to the data prior to the FFT. Additionally, the user has the option to zero pad the data, by selecting the ***Zero Pad*** data option.

If the ***Add Noise*** option is selected randomly distributed Gaussian noise will be added to the model with a standard deviation set by the value entered into the edit field located to the right of the check box.

The ***Compute*** button is used to compute the backscatter response measured by the radar. After pressing the Computer button, a plot of the frequency domain data will be displayed. If there are multiple scatterers, two frequency domain plots will be produced. The first plot generated show the individual signals that are generated by the different scatterers, and the second plot will show the combined.

The ***Target Parameters*** section is where the user can add new targets to the model. Targets are added by selecting the ***Add Targets*** button. This will bring up cross-hairs that allow the user to place a target in the "Sensor and Target" graph. The positions of the targets are updated in the ***Target X Position*** and ***Target Z Position*** fields.

Additionally, the data made by the model can be saved as a .mat file by pressing the ***Save Data*** button located at the bottom of the output plots (see below)

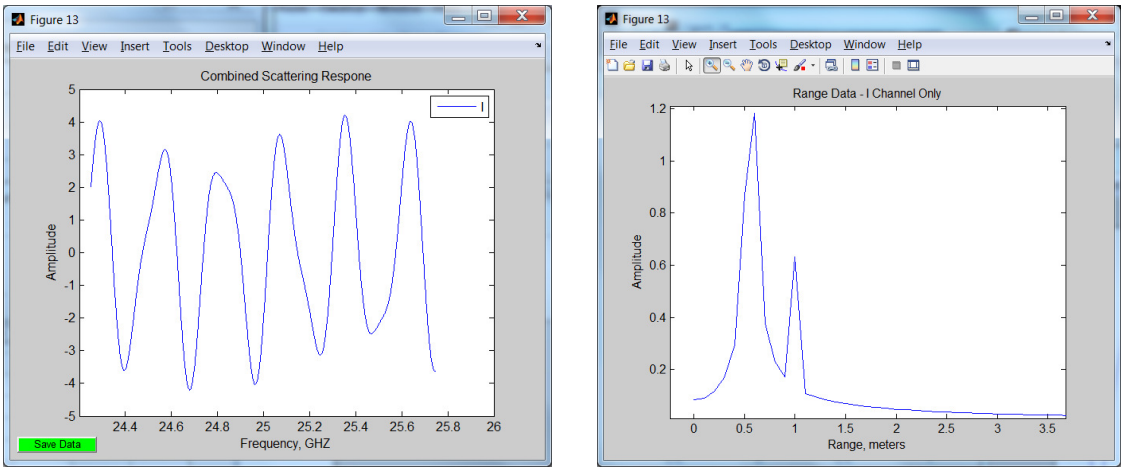

Figure 2 Example outputs from the Radar Explorer software.

```
%--------------------------------------------------------------------------
% COPYRIGHT 2015 BLACK CAT SCIENCE, INC.
% CONTACT INFORMATION: STEM@BLACKCATSCIENCE.COM
% WEBSITE: WWW.BLACKCATSCIENCE.COM
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% OTHER DOWNLOADS AVAILABLE AT:
% BCS: HTTP://WWW.BLACKCATSCIENCE.COM/MATLAB-CODE/
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% MATHWORKS: HTTP://WWW.MATHWORKS.COM/MATLABCENTRAL/FILEEXCHANGE/
%--------------------------------------------------------------------------
```