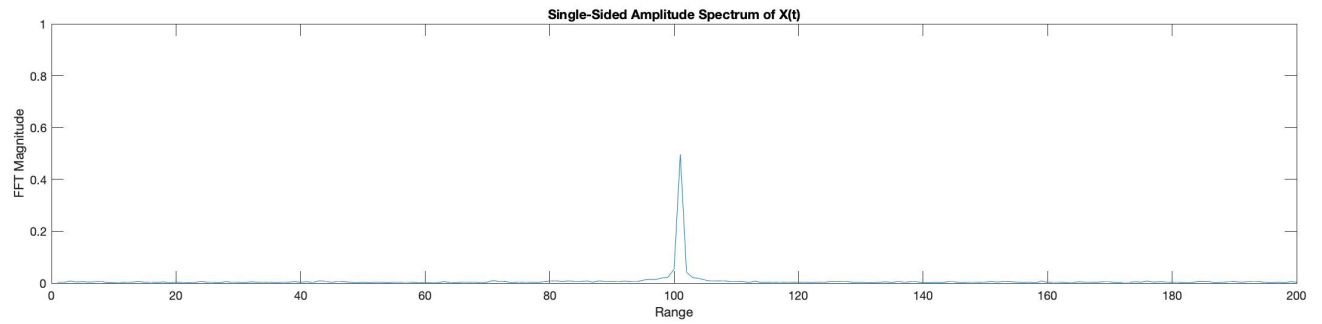


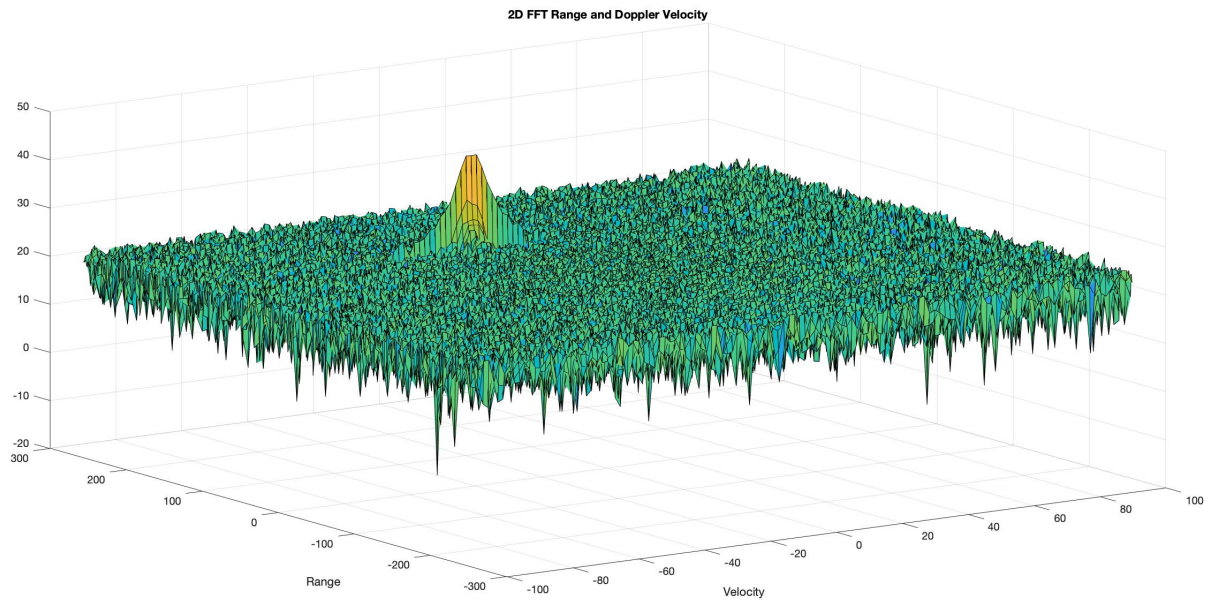
Write up: RADAR Target Generation and Detection

FMCW Waveform Design: Calculated Slope: 2.0455×10^{13}

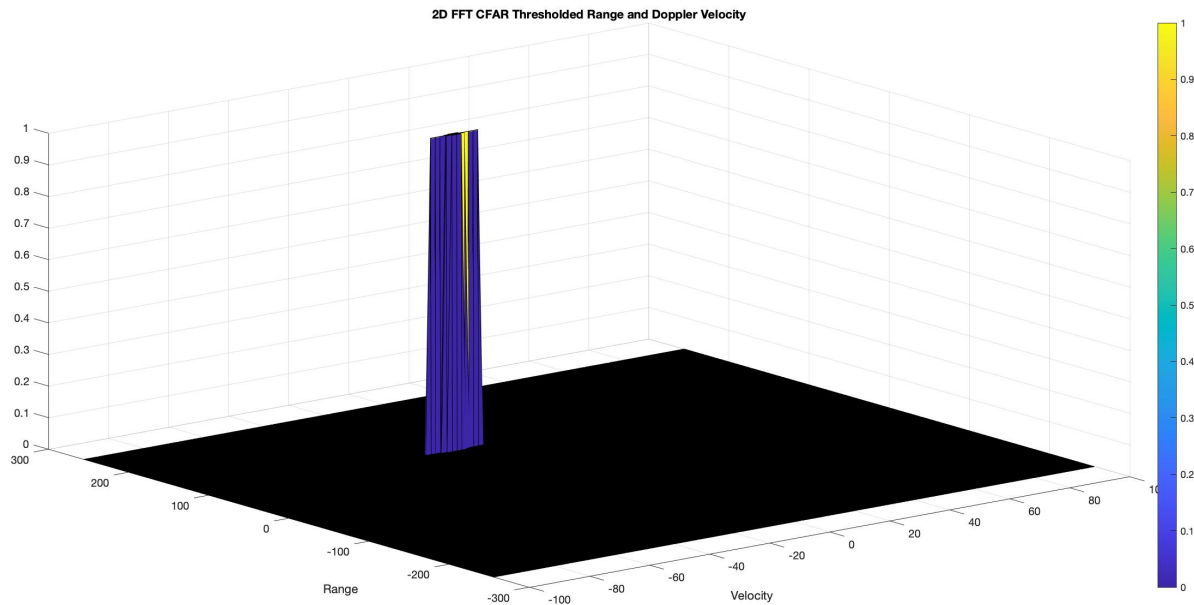
Range FFT (1st FFT)



2D FFT with noise



2D FFT CFAR Thresholded



Implementation steps for the 2D CFAR process

To implement the CFAR process first appropriate Training cells and guard cell values are set for both dimensions (range and doppler). Next an appropriate offset value for threshold is selected. Ideally these would be selected based on experience/prior knowledge of the system designer. For this project these values were selected by trial & error. The next step to implement the CFAR process is to create 2 nested for loops which will move the thresholding window in 2D. Inside these for loops for each window the training cell noise values are added and averaged to get the dynamic noise threshold. This is again done by 2 nested for loops looping over the cells of the window. The 2D FFT value which was previously calculated is compared at each cell under test is compared to the threshold to separate the noise from an actual hit. The information is again stored in a matrix composed of 1s and 0s where 1 is for valid hit and 0 for no hit.

Selection of Training, Guard cells and offset

The selection of training, guard cells, and offset was done through trial & error. Started with low values for the 3 parameters and increased them slowly till the output result seemed more plausible and accurate around the expected FFT 2D map.

Steps taken to suppress the non-thresholded cells at the edges

The non-thresholded cells at the edges were set to 0