

PROJECT SPECIFICATION

Radar Target Generation and Detection

FMCW Waveform Design

CRITERIA	MEETS SPECIFICATIONS
Using the given system requirements, design a FMCW waveform. Find its Bandwidth (B), chirp time (Tchirp) and slope of the chirp.	For given system requirements the calculated slope should be around $2e13$

Simulation Loop

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Simulate Target movement and calculate the beat or mixed signal for every timestamp.	A beat signal should be generated such that once range FFT implemented, it gives the correct range i.e the initial position of target assigned with an error margin of ± 10 meters.

Range FFT (1st FFT)

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Implement the Range FFT on the Beat or Mixed Signal and plot the result.	A correct implementation should generate a peak at the correct range, i.e the initial position of target assigned with an error margin of ± 10 meters.

2D CFAR

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Implement the 2D CFAR process on the output of 2D FFT operation, i.e the Range Doppler Map.	The 2D CFAR processing should be able to suppress the noise and separate the target signal. The output should match the image shared in walkthrough.
Create a CFAR README File	<p>In a README file, write brief explanations for the following:</p> <ul style="list-style-type: none">• Implementation steps for the 2D CFAR process.• Selection of Training, Guard cells and offset.• Steps taken to suppress the non-thresholded cells at the edges.