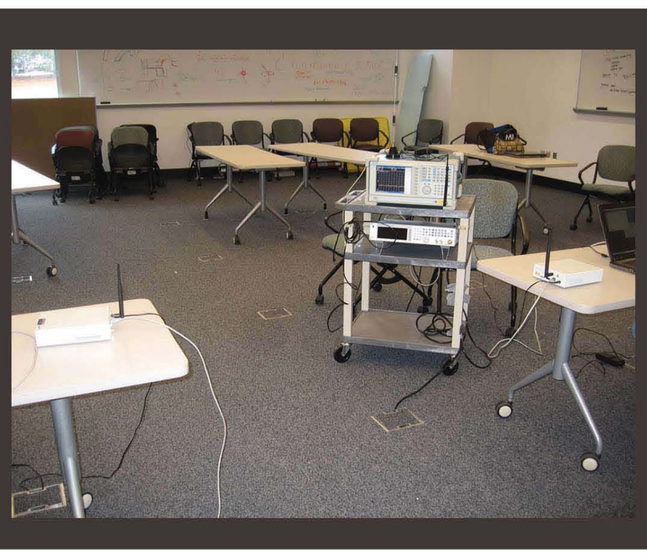
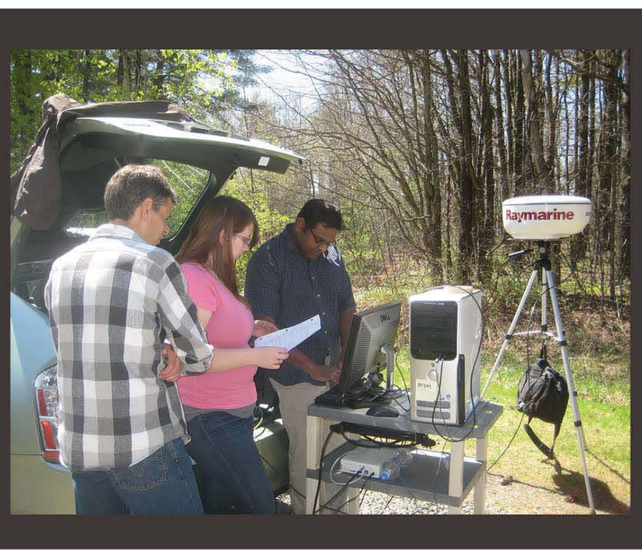
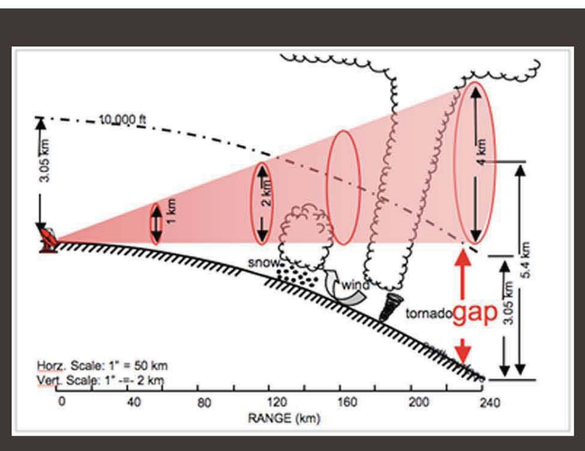
casa Raytheon SCOPE

Senior Capstone Program in Engineering



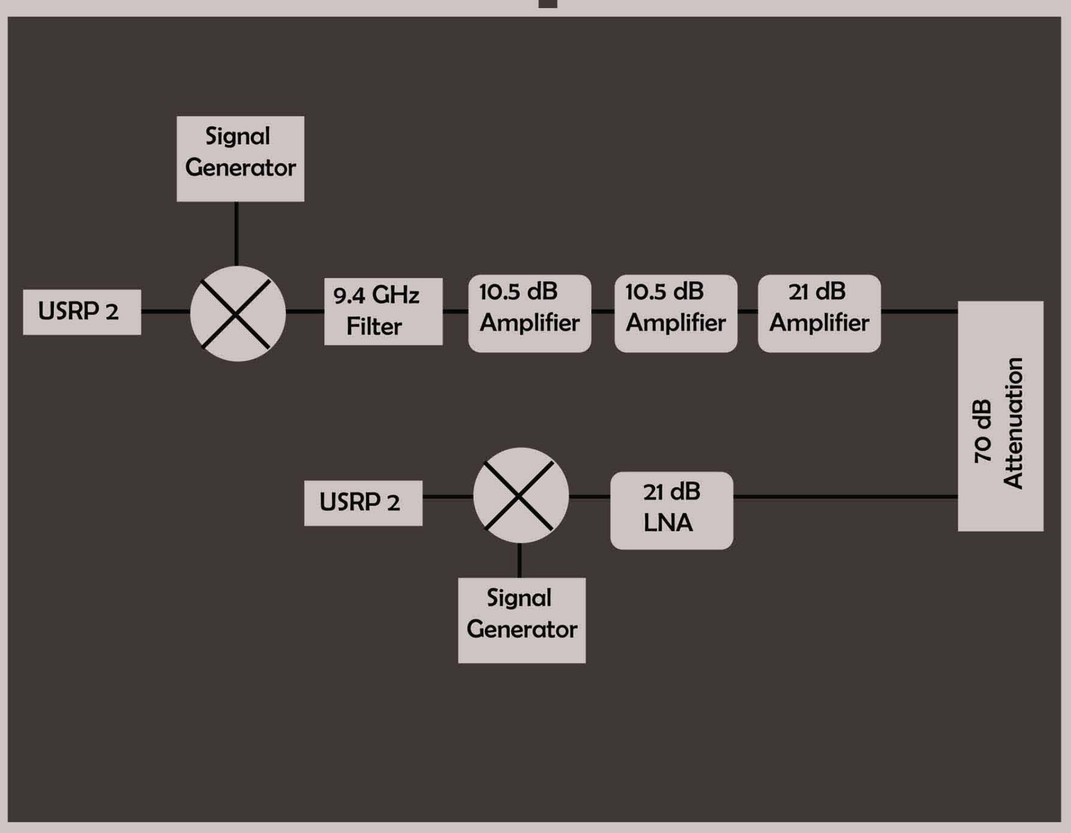




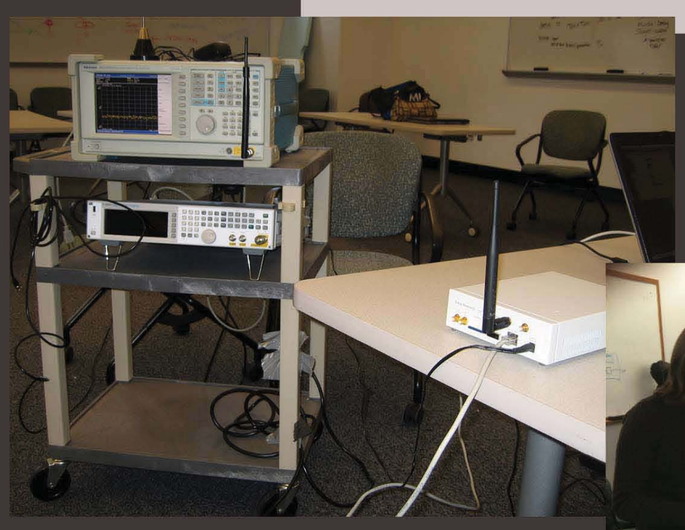
Background:

CASA is a research program geared towards making a more effective weather radar system in the US. In conjunction with Raytheon, UMass Amherst, and other affiliates, they hope to implement a densely spaced, low power network of radar. Weather Radar antennas are currently spaced 230km or more apart. By having a more closely packed radar network, low-lying weather phenomena can be more accurately detected. One problem with this densely spaced radar network is the data transmission. The current test setup uses existing internet bandwidth which is too expensive for a national system. The Raytheon Scope team was tasked with prototyping a communications system using radar hardware to mimic the CASA implementation. The goal of this research is to eventually develop low cost data transmission options for this dense radar network.

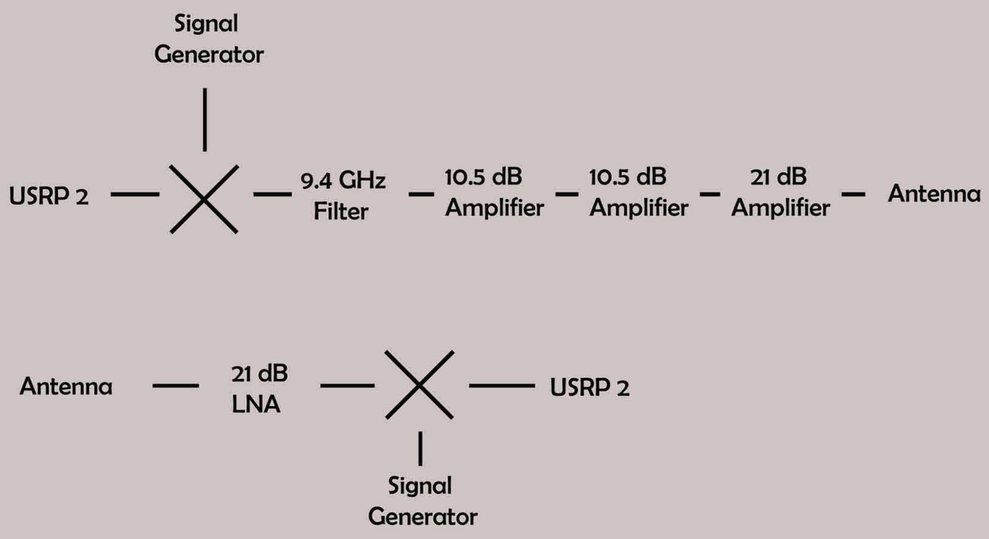
Wired Experiment

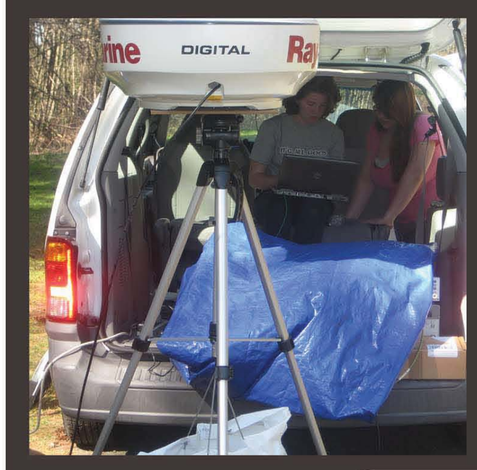


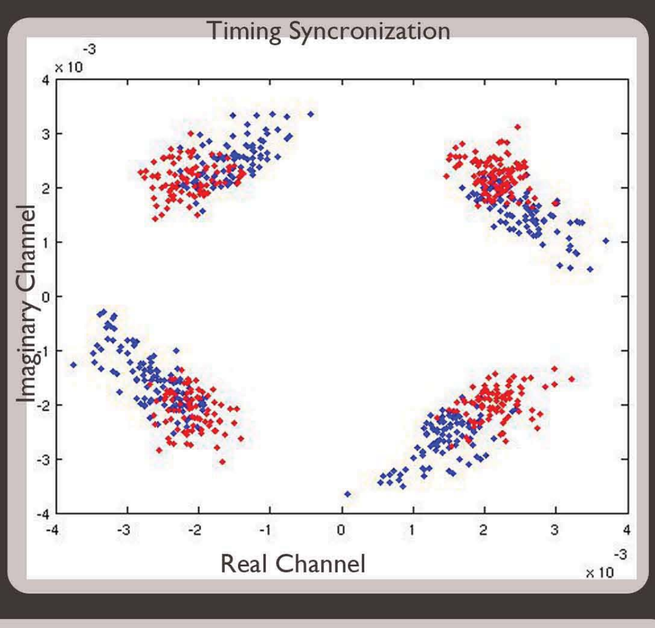
The wired experiment used high frequency attenuators (shown in the block diagram) to simulate free space path loss. This experiment validated our hardware and software setup and prepared us for field testing.



Wireless Experiment







The wireless experiment was meant to be a proof of concept for communications using radar hardware. We sucessfully transmitted data at the 9.4 GHz frequency of the proposed radar system.

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