1056-35-765   **Zhijun Qiao*** (`qiao@utpa.edu`), Edinburg, TX 78541, and **Jaime Lopez** and **Guillermo Garza**. *PDE Analysis and Cross-Range Imaging of Synthetic Aperture Radar.* Preliminary report.

We present a deeper observation and clarification of the mathematics of cross range imaging of SAR data. We begin with an introduction to the cross-range SAR image scenario, and establish the relationship between the signal received by the radar antenna and the desired target function. We then evaluate the matched-filtered version of the target function by use of Fourier transforms. Sampling of the echoed signal is also discussed to introduce the concept of the radar system Pulse Repetition Frequency (PRF), and its affect on the digitized signal. A method of reducing the PRF via slow-time compression is also explained. Importantly, we present a detailed derivation of slow-time sample spacing, which corrects the previous formulation. A cross-range imaging algorithm and a comparison of the results are given based on our slow-time sample spacing. Finally, we discuss a mathematical model for SAR imaging – Maxwell's equations for SAR image reconstruction. (Received September 17, 2009)