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Intelligent Automation Incorporated

Coherent distributed radar for high-resolution through-wall imaging

Progress Report 22

Contract No. N00014-10-C-0277

Sponsored by

Office of Naval Research

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1 Work performed this reporting period

1.1 Technical work performed in this reporting period

In this reporting period, we are continuing to collect indoors data and processing the scans for improving the indoors range accuracy. Since the transceivers are very tightly synchronized, the transmission phase and time, and the phase use for down conversion are well-controlled and repeatable as we perform the experiments. As a result, we observe a clear correlation between the range error, and the correlation amplitude. In Figure 1, we show the Correlator output for data with very large positive, or very large negative range error.

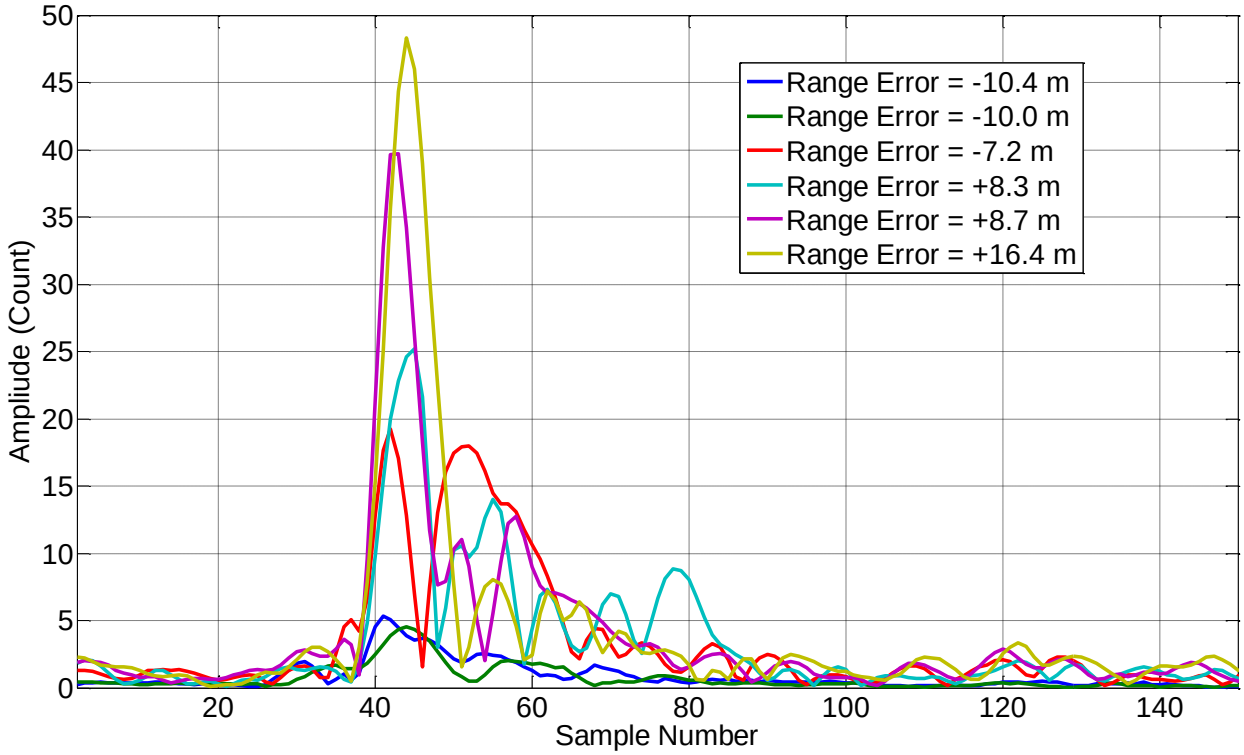

Figure 1. Correlator amplitude vs. sample number for data with various range errors.

The data shows that for large Correlator output, a positive range error is observed, and for small Correlator output, a negative range error output is observed. This result is of course not unexpected; these two cases correspond to constructive, and destructive multipath interference respectively. This observation suggests we can improve the range accuracy by methods that are based on channel estimation, such as successive interference cancelation.

We are continuing to take more data and develop algorithms for improved range accuracy based on both channel estimation and digital beamforming. We are also developing algorithms for bi-static radar imaging.