

[Leow Kwang Siong Jeremy] **Digital Pre-distortion with Direct Digital Synthesizer for wide bandwidth waveform Generation**

High resolution SAR requires transmission of signals with large bandwidths. In practice, RF components used in the radar have inherent nonlinearities. RF components with large bandwidth-to-centre frequency ratios tend to exhibit higher order modulations in both amplitude and phase, especially when these components have to be miniaturised. These nonlinearities introduce amplitude and phase distortions which directly affect the range impulse response.

One approach to equalise these modulations is with digital pre-distortion (DPD) of the Linear Frequency Modulated (LFM) waveform commonly used in SAR systems. Our submission proposes an FPGA implementation of the DPD by modifying the Direct Digital Synthesizer (DDS), while maintaining a low memory and resource utilisation in the processor. A spline curve fit of the measured RF modulations is used to provide an accurate representation of these distortions, while balancing the requirement to minimise the number of coefficients needed to represent the distortion.