**PhD Project Proposal**

School of Electronics, Electrical Engineering and Computer Science

& ECIT Global Research Institute

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| **Proposed Project Title: Practical solutions for frequency diverse arrays** |
| **Principal Supervisor: Dr Neil Buchanan Second Supervisor: Prof Vincent Fusco** |
| **Project Description:**  Frequency diverse arrays (FDAs) allow the focusing of a microwave beam towards a single point in space allowing both azimuth focusing and range focusing. This makes them uniquely different to any other form of microwave directional antenna which only allows azimuth focusing. This means that frequency diverse arrays can carry out functions that were previously considered impractical, such as producing the ability for microwave signals to “bend” round obstacles in their path. The FDA concept has mainly been studied theoretically to date, with promising simulation results, although practical demonstrations have been few. One of the current drawbacks is that the beams formed from FDAs vary with time, although some studies have produced theoretical methods to make the beams time invariant [1]. To date, we are not aware of any practical demonstration of a time invariant FDA, and this will be the main focus of this PhD. Particular emphasis will be placed on the design and demonstration of novel frequency generation circuits that can form time invariant FDA beams.  [1] M. Yao, W. Wu and D. G. Fang, "Frequency Diverse Array Antenna Using Time-Modulated Optimized Frequency Offset to Obtain Time-Invariant Spatial Fine Focusing Beampattern," in IEEE Transactions on Antennas and Propagation, vol. 64, no. 10, pp. 4434-4446, Oct. 2016. https://ieeexplore.ieee.org/document/7522082/ |
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