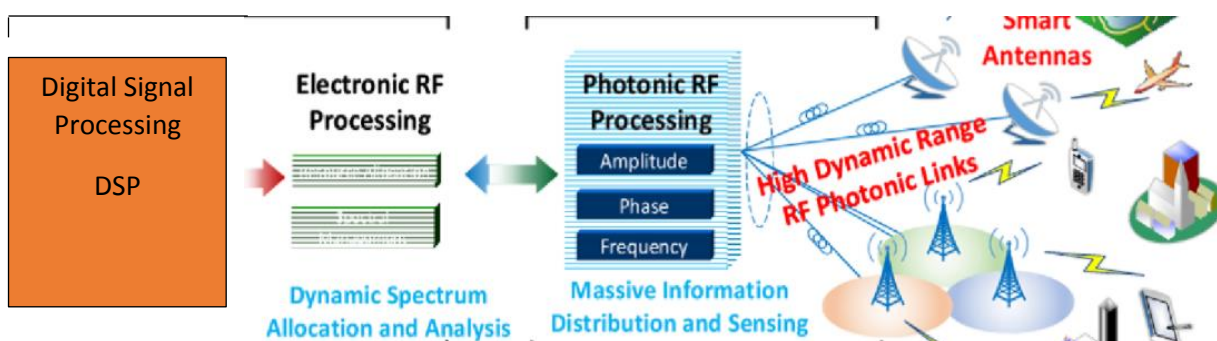


Microwave photonic signal processing by exploiting intrinsic nonlinear effects in Optical Fibre for future Radar and Wireless communication Systems.

Signal carries intelligence information for electronic warfare (EW) such as radar detection and wireless communication systems. When information is converted into signal, it becomes meaningless to human unless the signal is processed by a system to extract useful information back from the signal. Hence signal processing is very important and it requires an optimized system for signal processing.

Radio frequency (RF) and microwave frequency systems are facing a significant increase in bandwidth as well as frequencies on which they operate, shifting from microwaves to millimetre-wave frequencies and even to terahertz frequencies. Processing this terahertz frequency signal in pure electrical domain raised significant challenges. And even not possible to process at all in real time due to electrical component's bandwidth bottleneck and interference of ultra-high frequency electromagnetic wave with electronic components at terahertz frequency.

Photonic domain is a green field comes with terahertz (400-800) THz of frequency ranges along with huge abandoned bandwidth of 100 GHz and inherent immune to electromagnetic noise and interference. As a result, photonic domain is the perfect platform to circumvent the bottleneck problems of processing ultra-high frequency microwave signals not possible to process in pure electrical domain.



We harness terahertz frequency radio wave with optical domain to process terahertz frequency RF signal inside an optical fibre on the fly by exploiting intrinsic nonlinear optical phenomena such as Stimulated Brillouin Scattering (SBS). Our photonic group has been conducting many research project with industry. Our research collaborators world leader in aviation and military application such as NATEP (National Aerospace Technology Programme) and Leonardo MW Ltd.