BROADCAST: BROADband, Compact and Agile Silicon Photonics Technology

Team:

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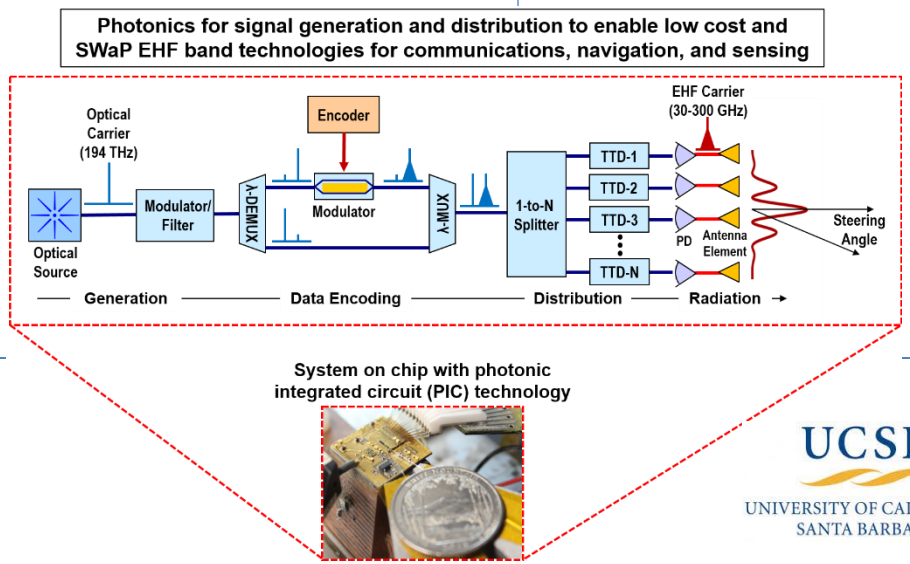
Research Objectives

- Demonstrate ultra-low size, weight and power (SWaP) microwave photonic integrated circuits (PICs) for EHF band component and subsystem technologies
- Apply integrated photonics to the generation and distribution of EHF band signals to demonstrate continuous an squint-free beamsteering



Approach

- Utilize photonics for power-efficient signal generation/frequency conversion and for true-time delay (TTD) of broadband signals
- Enable tunable carrier frequency over wide portion of EHF band using tunable lasers or comb sources with optical filters
- Leverage optical ring resonators (ORRs) for TTD to enable wide bandwidth, large delay, and continuous delay tuning

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Potential Impact

- Photonics can significantly reduce power consumption while increasing signal frequency, which is in contrast to high-speed electronics technology.
- System cost and SWaP will be drastically reduced, enabling more frequent missions on smaller platforms
- PIC technology is cross cutting and can also be leveraged for free space laser communications, and lidar