



Project Summary 132

Internet of Moving Things using Full Duplex Mesh Networks: Presentation

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Data-Supported Transportation Operations & Planning Center (D-STOP)

A Tier 1 USDOT University Transportation Center at The University of Texas at Austin



D-STOP is a collaborative initiative by researchers at the Center for Transportation Research and the Wireless Networking and Communications Group at The University of Texas at Austin.

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D-STOP

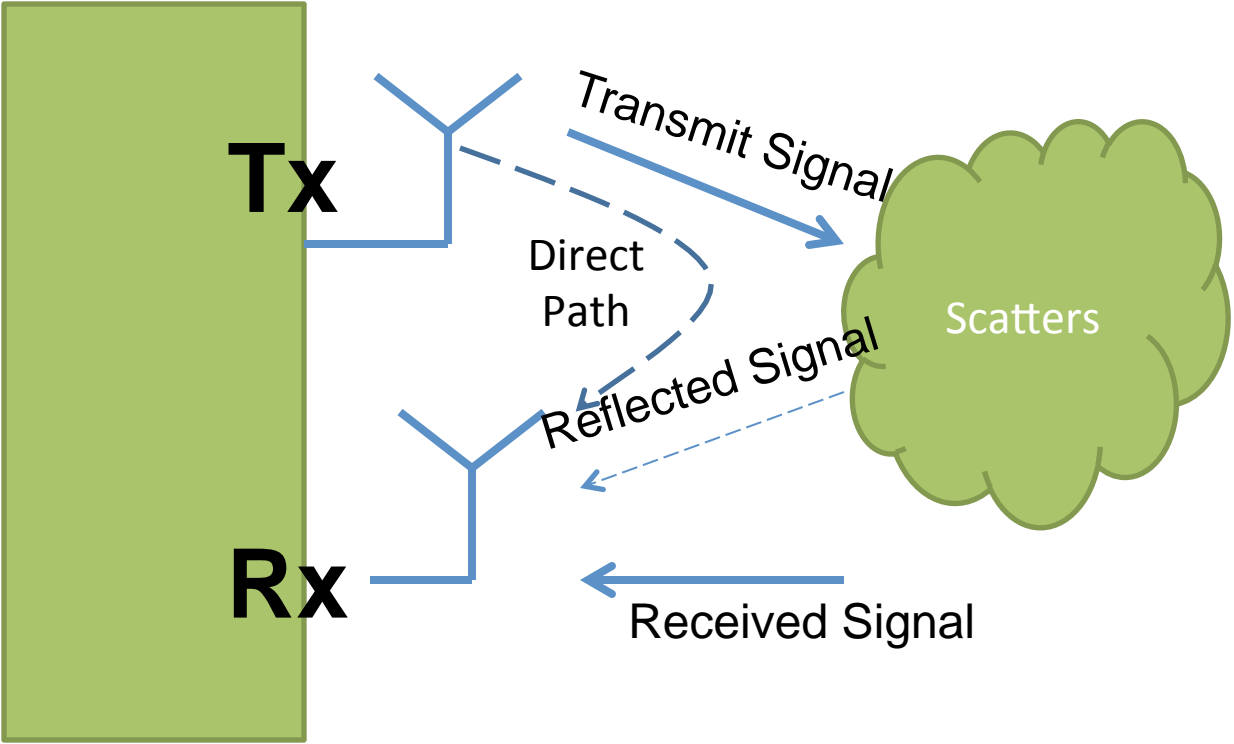
Internet of Moving Things using Full Duplex Mesh Networks

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Self Interference in Full Duplex

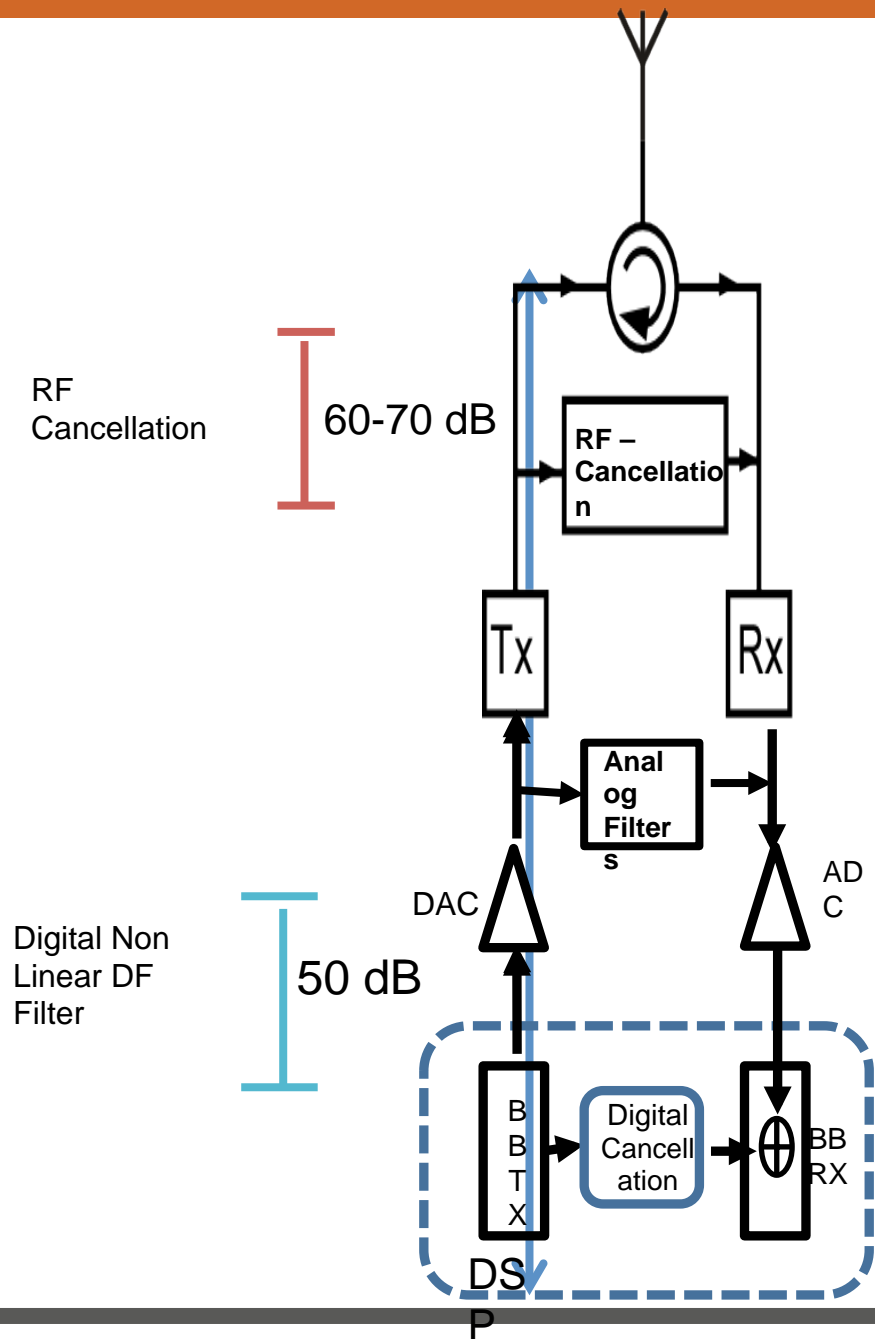


x -> received signal
z -> transmit signal
w -> noise signal

True Full Duplex Radios

- Possible through self-interference isolation and cancellation
 - 110+dB of isolation/cancellation necessary
- Enables listen-while-talking
 - Much more efficient mobile meshing

- Cancellation of self interference
 - Using discrete components
 - 110 dB
- Single antenna
- Works well with MIMO



Our prototype: 2.4G, 20 MHz, 100 Mbps



Advantages of Full Duplex

**Double
Data
Rate**

**Up to
1Gbps**

**Low
Battery
Power**

**Optimized
Scheduling**

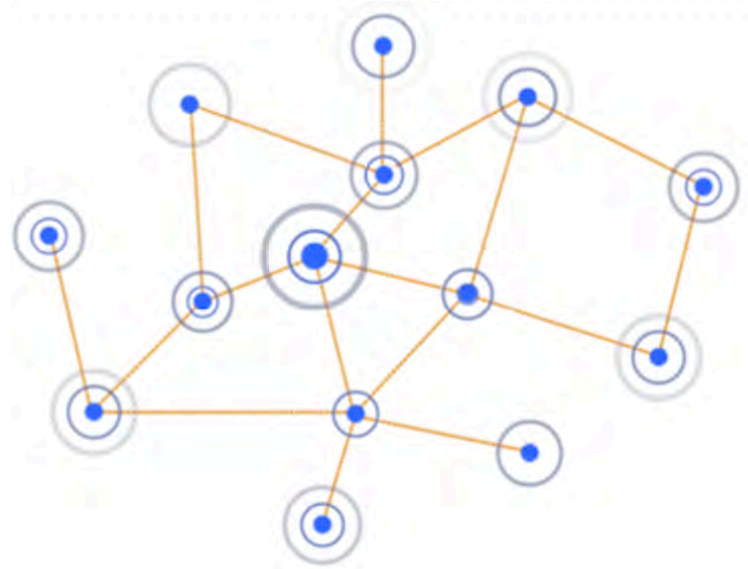
**PHY
Secure**

**Collision
Detection**

**Long
Range**

Internet of Moving Things (IoMT)

- Full duplex + mobile meshing
 - Marriage made in heaven
 - Low overhead, high throughput meshing
- Connect people and devices as they move
 - As they move
 - Discovery, routing, handoff efficient



Testing over actual paths

Structured & Random Movement



Scalable Testing – Great Results



Low cost and easy to maintain