

Welcome to the DMIMO Summit @WPI

D.R. Brown III

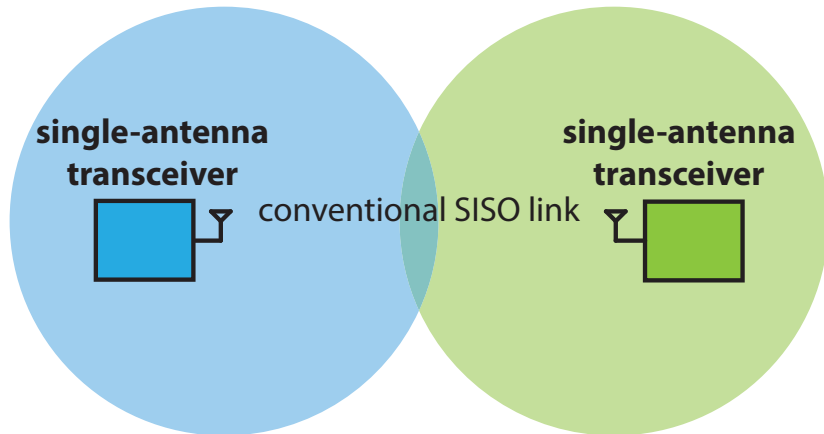
WPI

August 18, 2014

Welcome to WPI



Conventional Single-Antenna Communication



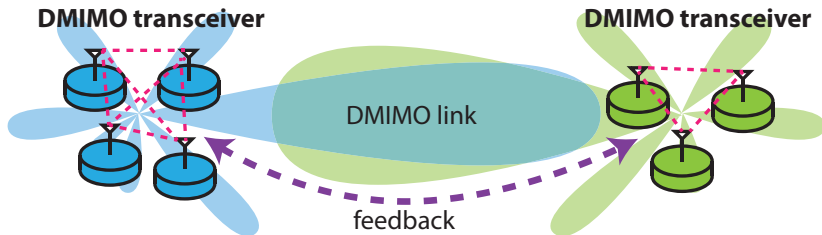
- ▶ High-power, low-range, indiscriminate interference.
- ▶ Poor reliability in fading environments.

Coherent Conventional MIMO Communication



- ▶ Diversity gains even without channel knowledge
- ▶ Directional transmission with beams and nulls (coherent techniques)
- ▶ Increased range
- ▶ Increased rate
- ▶ Reduced interference
- ▶ Improved security
- ▶ ...

Distributed MIMO Communication Systems



- ▶ Form virtual antenna arrays from single-antenna transceivers
- ▶ Extend the benefits of MIMO communication to networks of single-antenna devices
- ▶ Also called “collaborative MIMO”, “network MIMO”, “coordinated multipoint”, ...

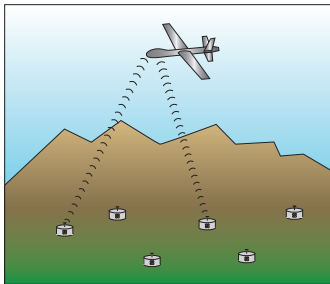
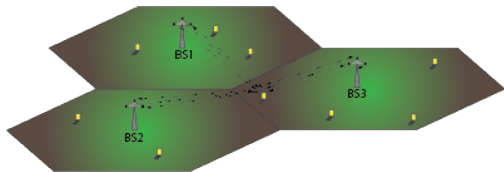
Some Coherent DMIMO Challenges



1. Independent local oscillators.
2. Random and/or time-varying array geometries.
3. Intra-cluster information exchange.
4. Feedback overhead.
5. Quantization effects.
6. Scalability.

DMIMO Summit Goals

1. Learn about recent developments in DMIMO.
2. Participate in an open discussion on new challenges and ideas.
3. Develop collaborations.



Time	Speaker	Institution	Title
08:30 - 09:00	R. Brown	WPI	DMIMO introduction, summit goals
09:00 - 09:45	R. Mudumbai	Ulowa	Program summary, DMIMO USRP testbed results
09:45 - 10:30	S. Dasgupta	Ulowa	DMIMO nullforming
10:30 - 10:45	—	—	<i>discussion/break</i>
10:45 - 11:30	R. Brown	WPI	DMIMO receive beamforming with quantized observations
11:30 - 12:15	U. Madhow	UCSB	Nonlinear phase unwrapping, scalable receive beamforming, and distributed degrees of freedom for DMIMO
12:15 - 13:30	—	—	<i>lunch and USRP testbed demos</i>
13:30 - 14:15	P. Bidigare	BBN	Reciprocity-based DMIMO in multipath environments
14:15 - 15:00	A. Margetts	MITLL	Application of DMIMO in Squad-to-Base Communications
15:00 - 15:15	—	—	<i>discussion/break</i>
15:15 - 16:00	M. Vu	Tufts	Uplink User-Assisted Distributed Relaying in Cellular Networks
16:00 - 17:00	—	—	<i>conclusions, open discussion</i>

Attendees

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