# Transmit Beamforming for a Large Reconfigurable Antenna Array

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## BACKGROUND

Many space-time transmission schemes have been proposed recently to exploit the high channel capacity of MIMO communication systems. However, algorithms for a large antenna array (LAA) remain an open research problem. The standard channel estimation and space-time modulation schemes are not practical for LAAs due to high implementation complexity.

## TECHNOLOGY DESCRIPTION

University researchers have developed a novel transmit beamforming scheme based on a reconfigurable LAA. Compared to the traditional schemes, this new scheme requires a much smaller number of RF chains, yet it still enjoys the high performance offered from the LAA. Based on a reconfigurable LAA, a pilot-assisted round robin channel estimation algorithm has been developed. With this estimation algorithm, the tracking of the fading channel is significantly simplified at the mobile station. Further, an adaptive transmit beamforming algorithm based on relative channel phase feedback at the transmitter is also conceived.

Numerical simulations show that the proposed scheme accomplishes superior performance for various kinds of time varying Rayleigh fading channels. Overall, the proposed system enjoys good performance, high flexibility, low cost as well as low power consumption at both the base station and mobile station.

## APPLICATIONS

This invention can be used for the existing and next generation wireless communication systems. It can be adopted for any TDMA and CDMA wireless systems with multiple transmit antennas. For example, it can be used in IEEE 802.11b WiFi system or the WCDMA systems. Also, it can be adopted by the next generation of these standards, for example IEEE 802.11n, 4G, and so on. Another major area of application is the communication systems in the defense industry.

## PATENT STATUS

| Country | Type | Number | Dated | Case |
|---|---|---|---|---|
| United States Of America | Issued Patent | 7,539,458 | 05/26/2009 | 2006-218 |

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## OTHER INFORMATION

## CATEGORIZED AS

» **Communications**
» Other

## RELATED CASES

2006-218-0

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