1014-52-594 **Walter J. Whiteley*** (`whiteley@mathstat.yorku.ca`), Department of Mathematics and Statistics, York University, 4700 Keele Street, Toronto, Ontario M3J 1P3, Canada. *Locating points in a sensor network, with distance information.* Preliminary report.

In many applications, there is a basic geometric and combinatorial problem: do we have enough geometric data (pairwise distances) to locate all of the objects uniquely? Recent results of Jackson and Jordan characterize which graphs of distances G in the plane give unique locations, for 'generic' configurations. We present some new results on graphs G in the plane such that the 'square graph' G^2 (adding edges between neighbors of each vertex in G) gives this generic global rigidity. These are graphs which are (i) connected and (ii) removing a single edge can only separate a single vertex, not two larger components. The extension to 3-space is: G^3 gives generic global rigidity if and only if G is (i)connected, and (ii) removing any 2-valent vertex can only separate a single vertex, not two larger components.

We close with a set of new conjectures about globally rigid graphs in adjacent dimensions (n-space and $n + 1$-space), using the techniques of coning, and raising the power. The initial results evolved from joint work with Brian Anderson (Australian National University), David Goldenberg, Stephen Morse, Richard Yang (Yale), Tolga Eren and Peter Belhumeur (Columbia). The new results include joint work with Matthew Cheung, York University. (Received September 21, 2005)