
A MAC Protocol for Full Exploitation of Directional Antenna in Ad-hoc Wireless Networks

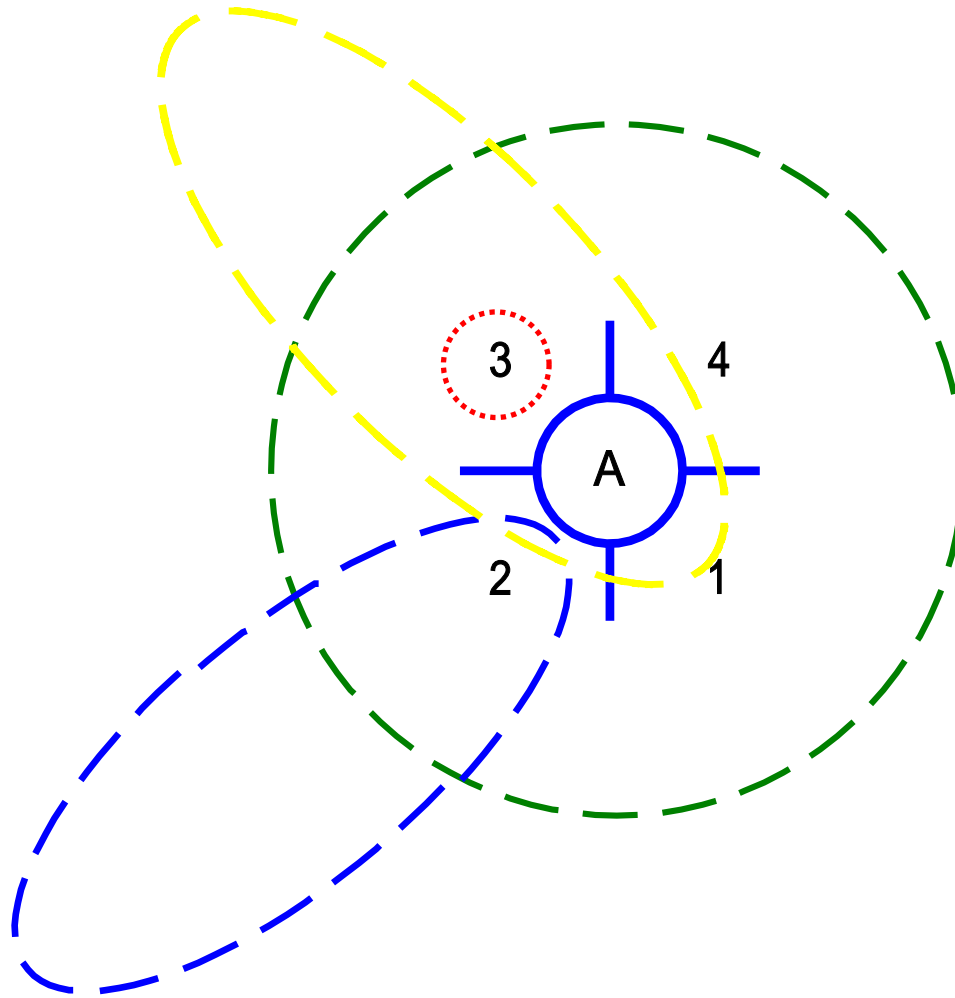
ACM MobiCom 2003

Presented by 何德威

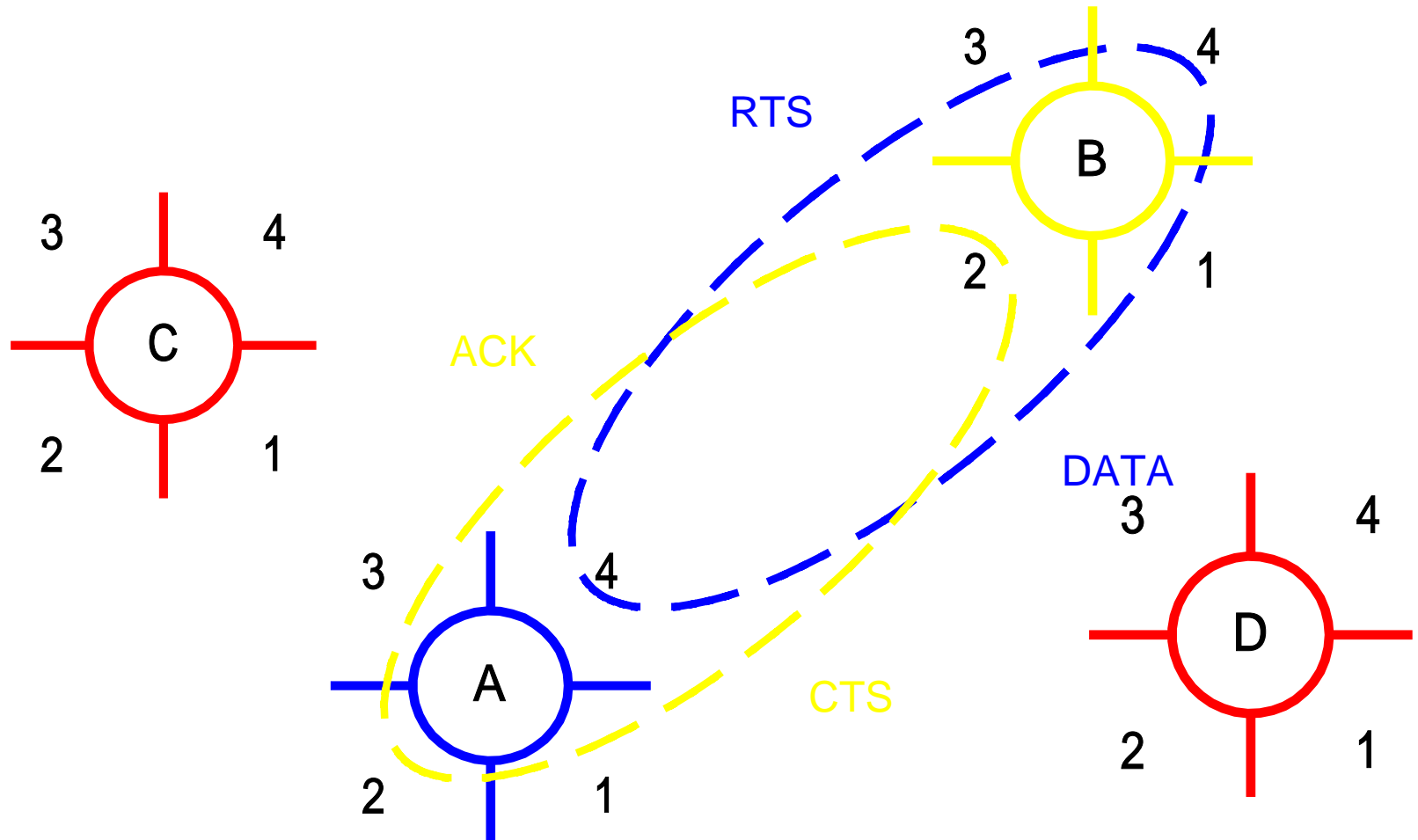
Outline

- Introduction
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- The Proposed Protocol
- Simulations
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Introduction(1/3)



Introduction(2/3)

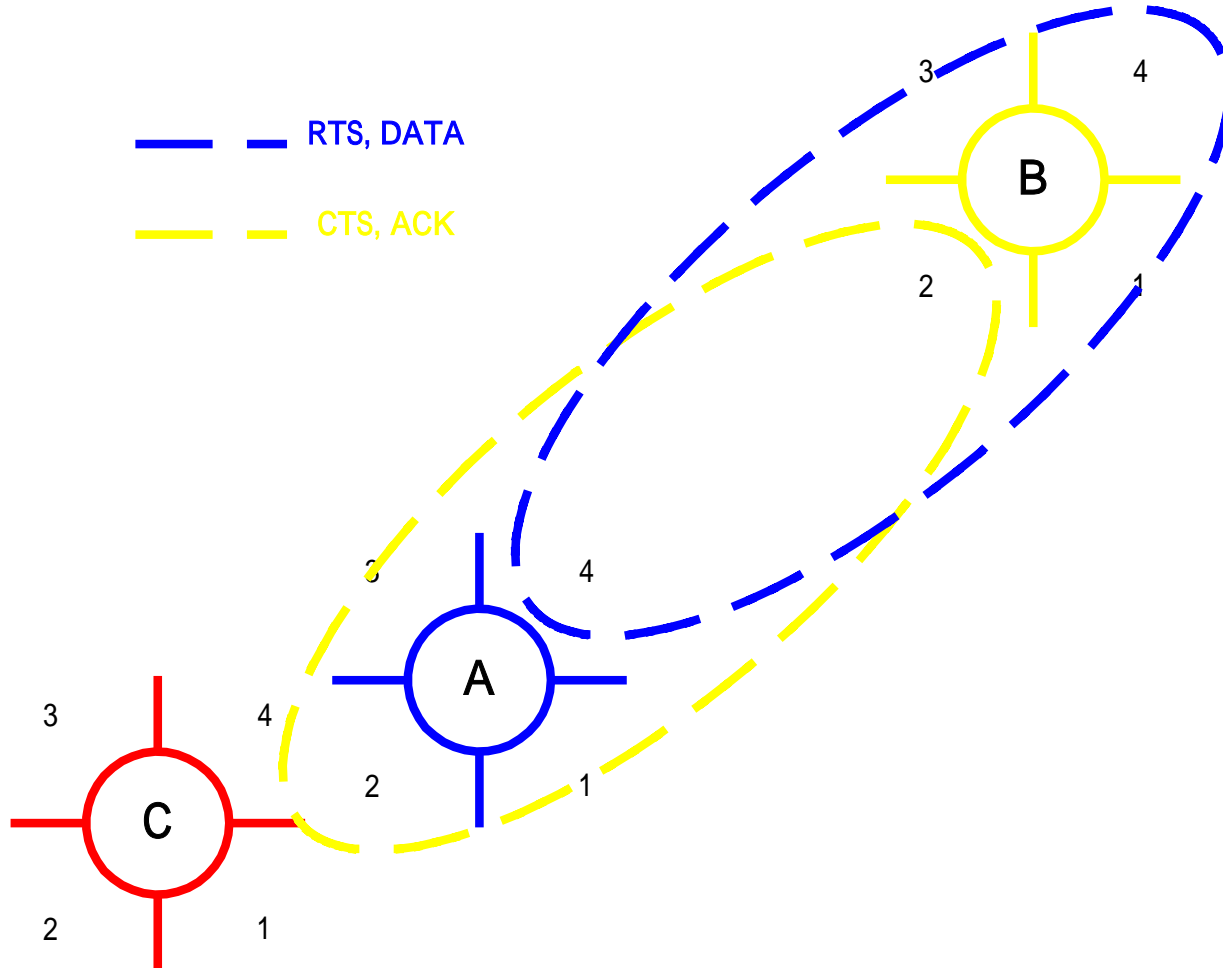


Introduction(3/3)

- Directional antennas in ad hoc networks offer many benefits compared with classical omnidirectional antennas including increase of *spatial reuse*, *coverage range* and *network capacity*.
- Unfortunately, directional transmissions increase *the hidden terminal problem*, *the deafness problem* and *the problem of determination of neighbors' locations*.

Problem Definition

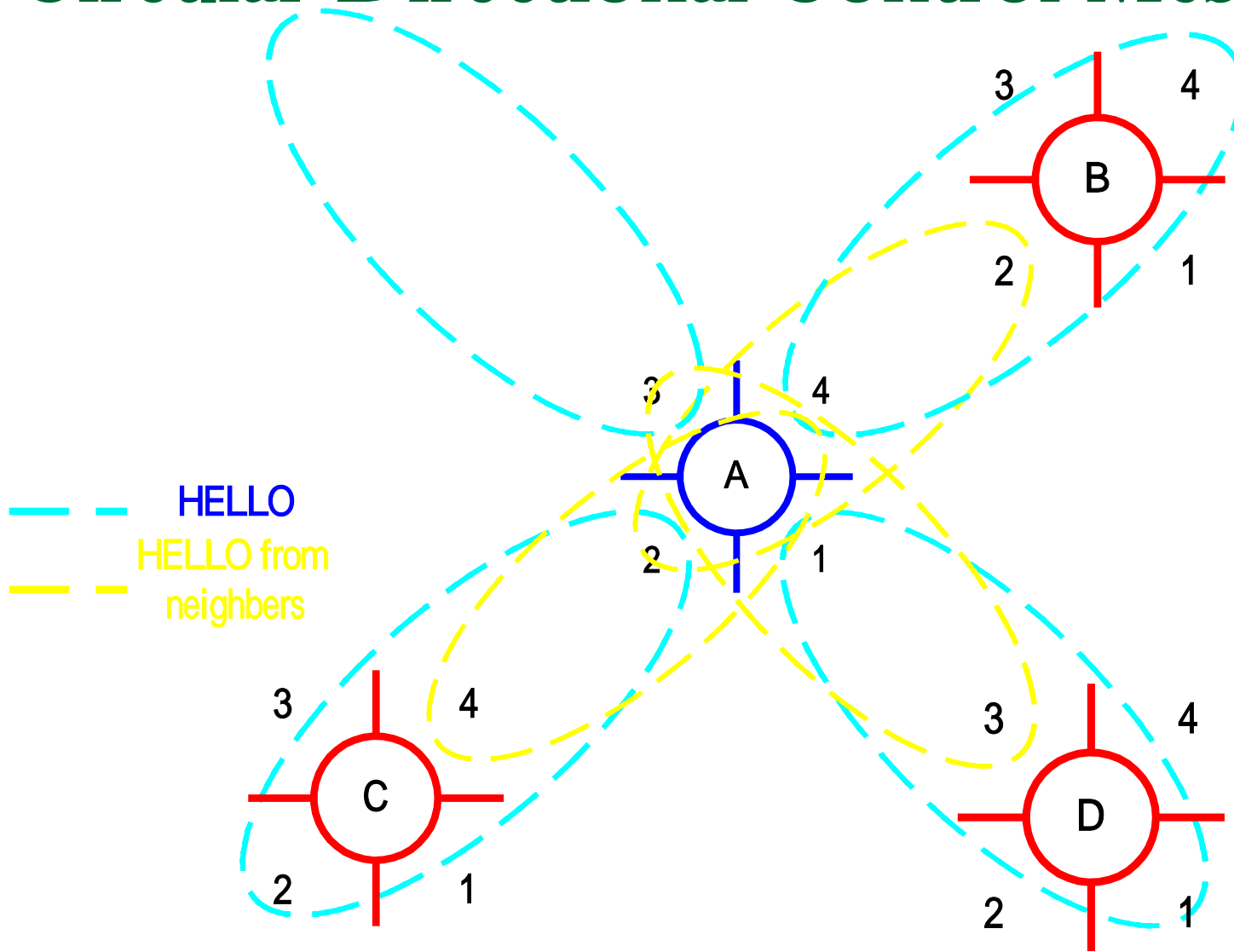
- An example of hidden terminal problem and deafness problem.



The Proposed Protocol

- Circular Directional Control messages
- Circular Directional RTS
 - The RTS is transmitted *consecutively in a circular way*, until it scans all the area around the transmitter.
 - The neighbors are *informed with the intended transmission*.
- D-NAV
 - D-NAV uses a table that keeps track of *the directions* and *the corresponding durations*.

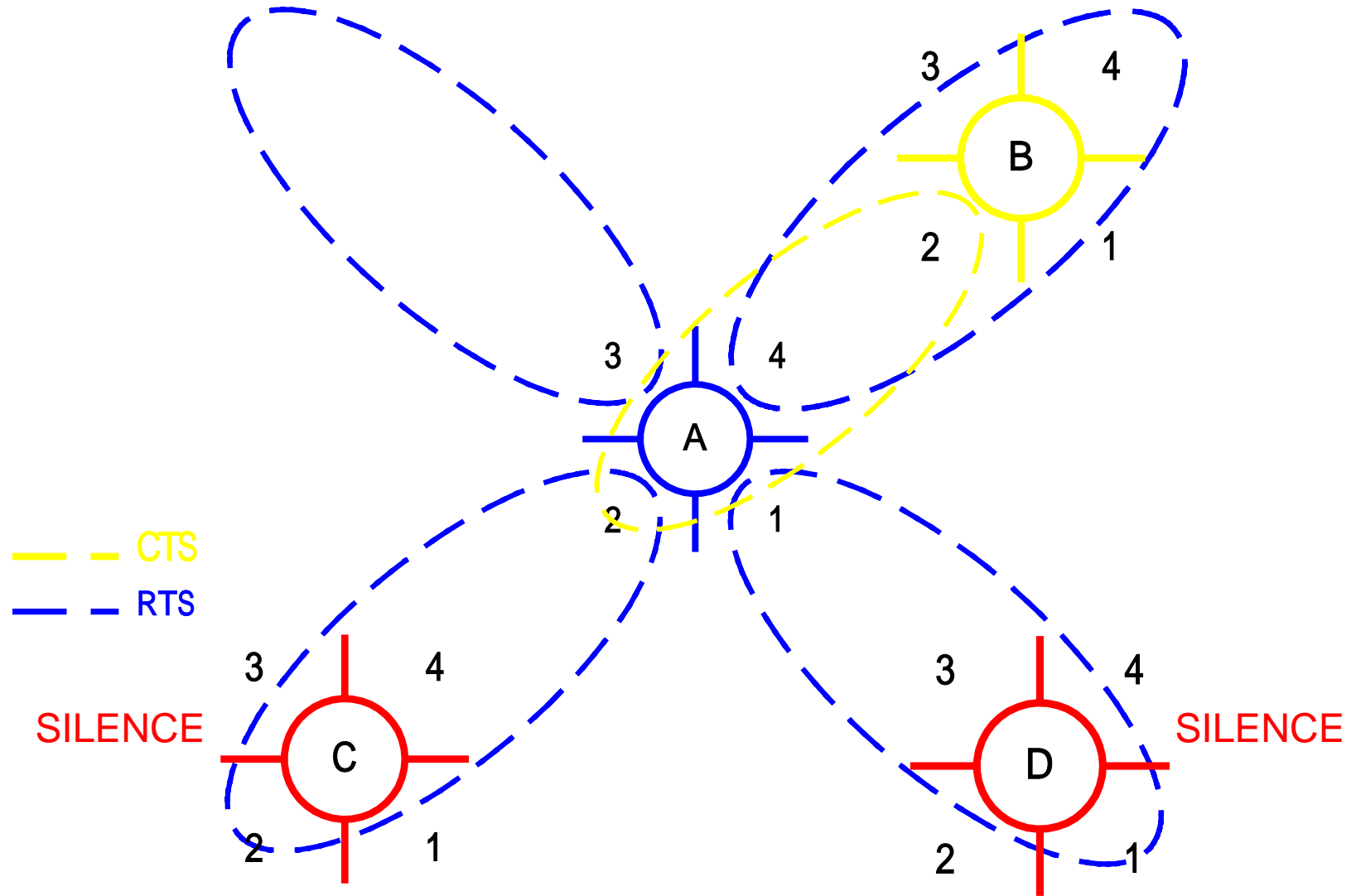
Circular Directional Control Messages



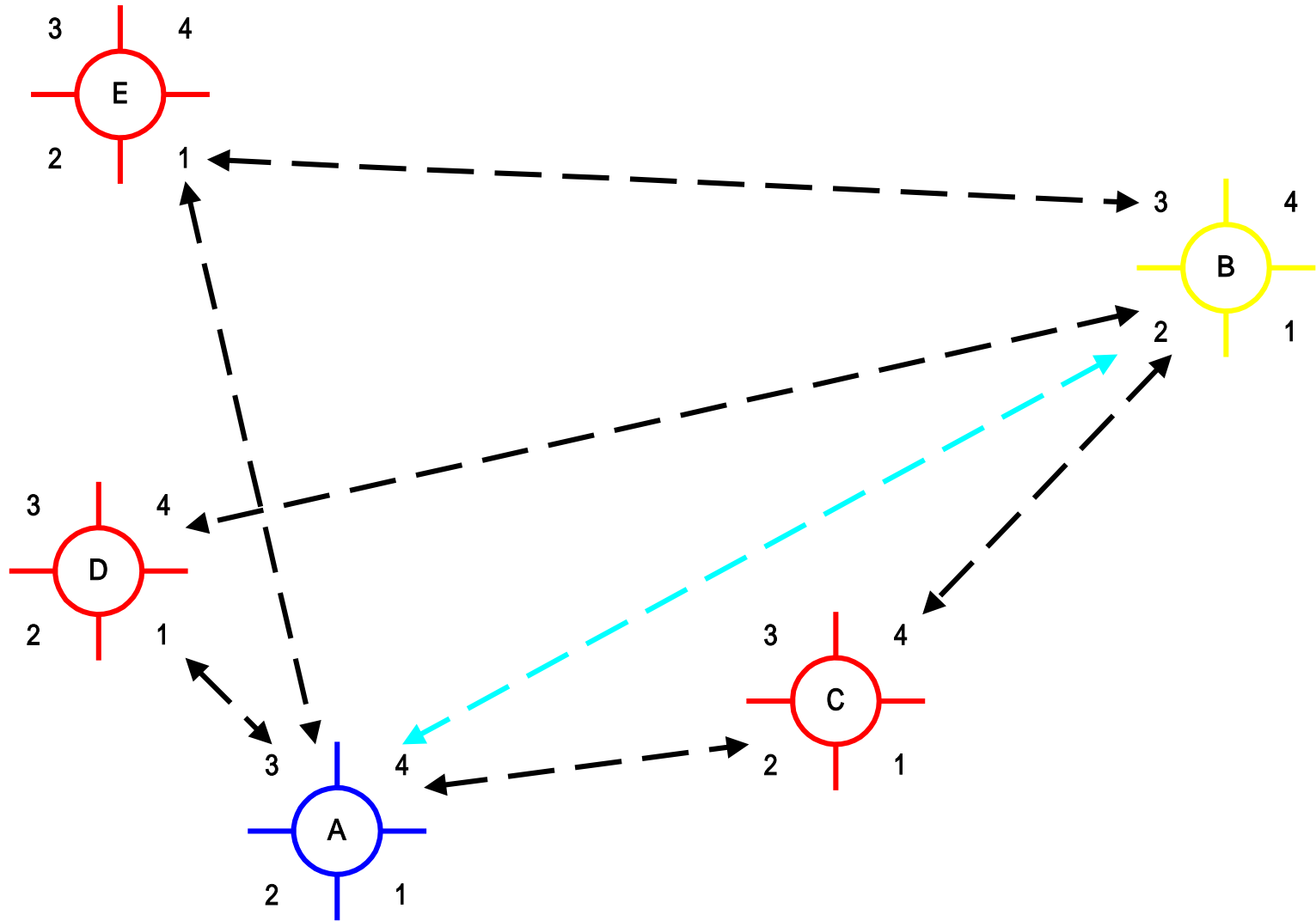
Location Table

Me	Neighbor	My Beam	Neighbor's Beam
A	B	4	2
A	C	2	4
A	D	1	3

Circular Directional RTS

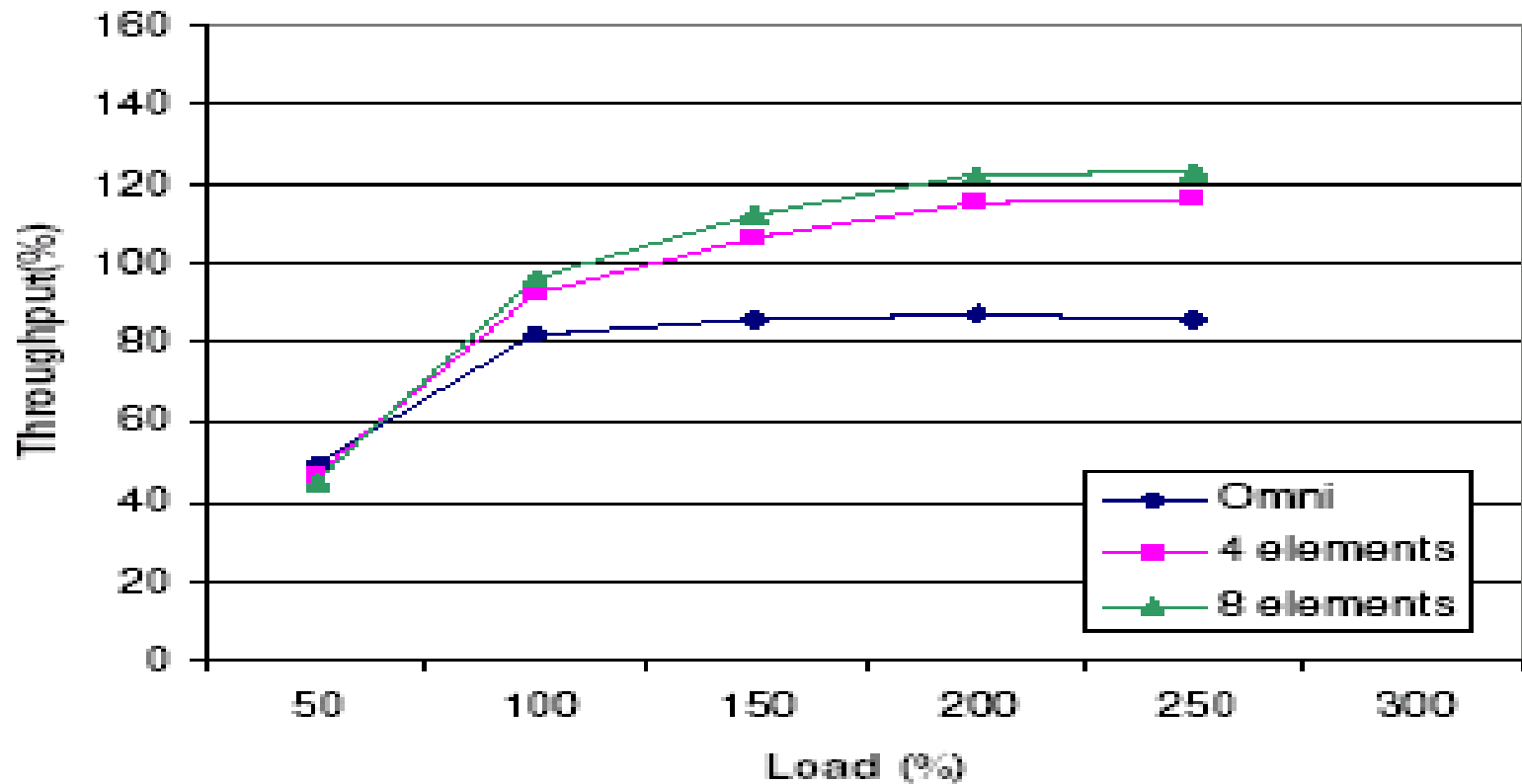


D-NAV



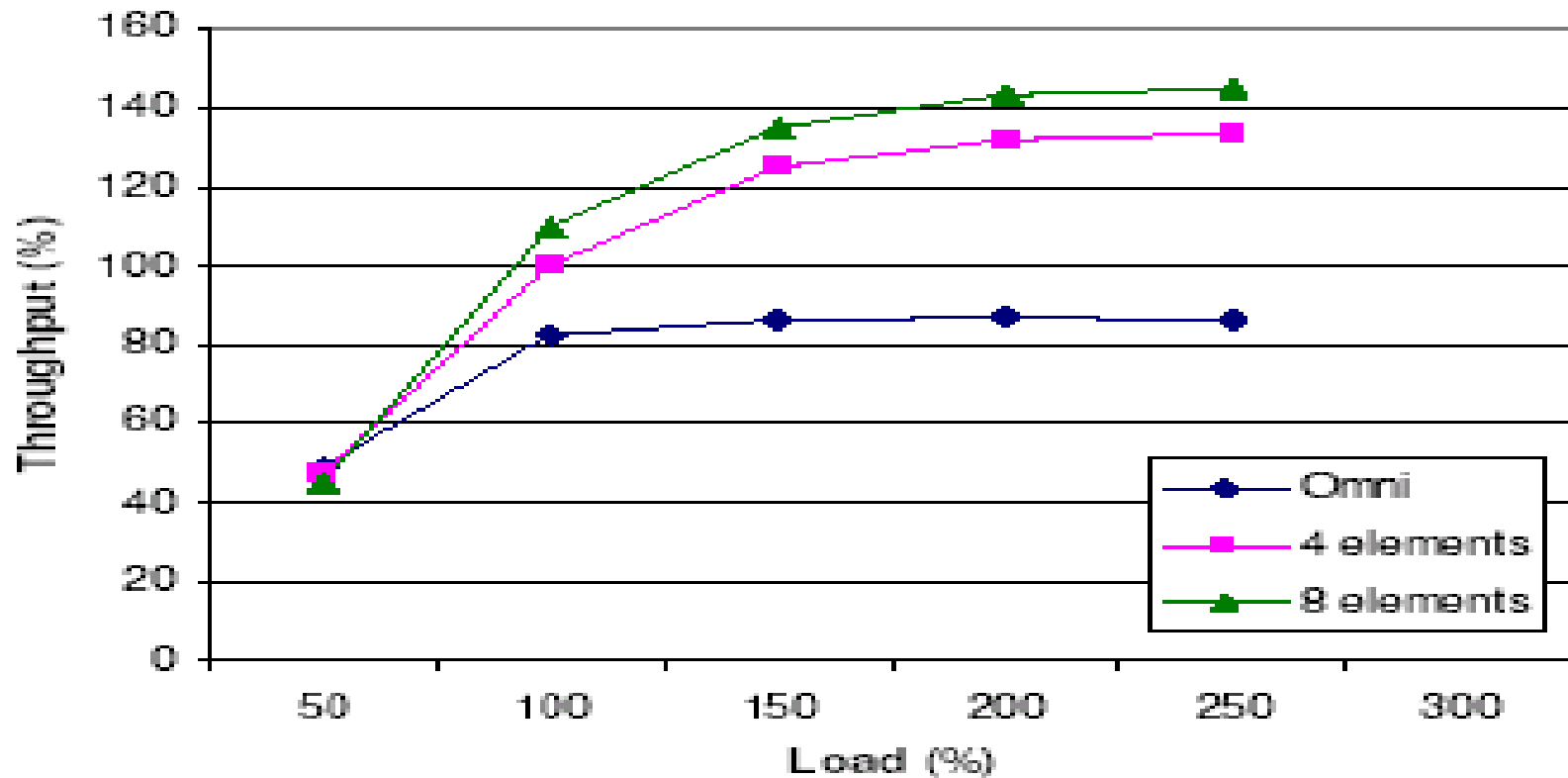
Simulations(1/3)

- Random topology with 7 nodes.



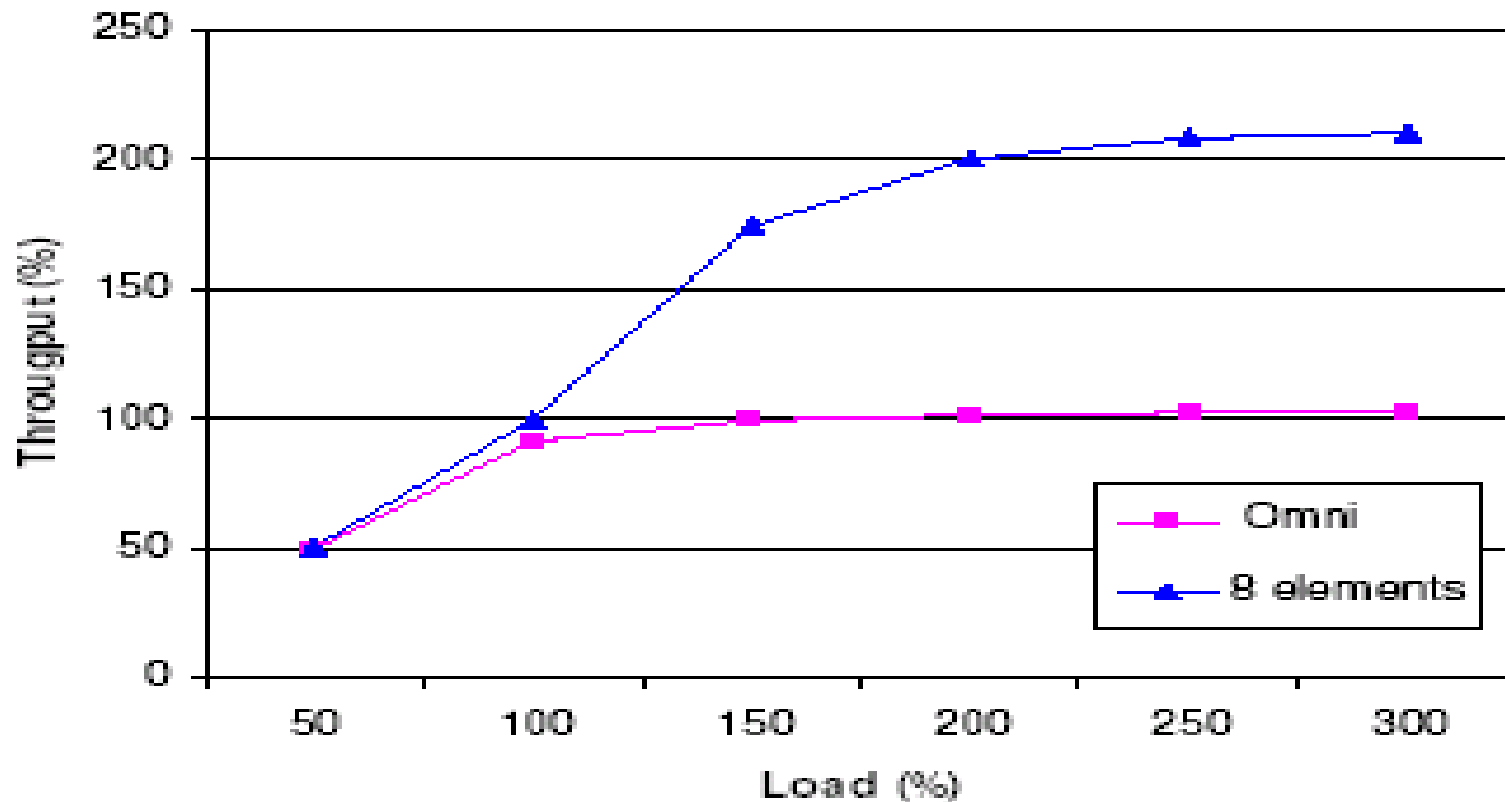
Simulations(2/3)

- Random topology with 15 nodes.



Simulations(3/3)

- Grid topology with 9 nodes



Conclusions

- The proposed algorithm is based on *the circular directional control messages* that scans the area around to find neighbors' location periodically.
- Also *the circular directional RTS* will inform the neighbors for the intended communication.
- Finally, the authors use a simple scheme for neighbors to *defer their transmission* in order not to destroy the ongoing transmission.