Cooperative Consensus Seeking

Objective: Facilitate the development of distributed cooperative control algorithms for teams of UAVs that must operate in environments where the communication topology is sparse, unreliable, and constantly changing, and where communication packets are frequently lost.

Principle Investigators: Randy Beard

Sample Publication: Wei Ren, Randal W. Beard, *Distributed Consensus in Multi-Vehicle Cooperative Control,* Communication and Control Engineering Series, Springer Verlag, New York, 2007, ISBN: 978-1-84800-014-8**.**

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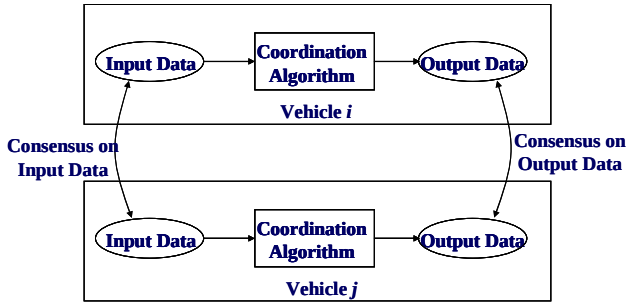
Problem Summary

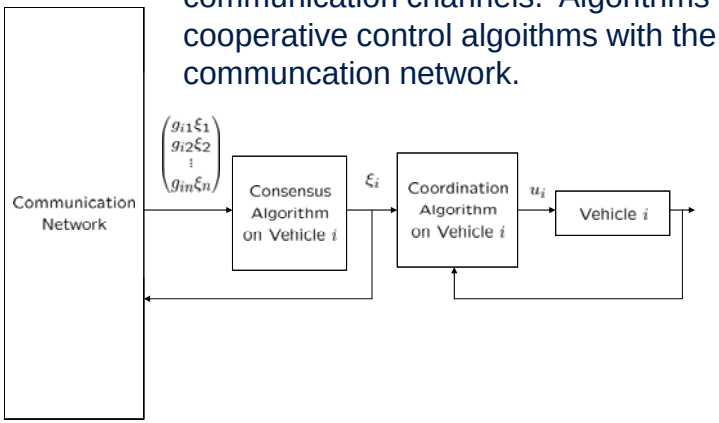


Consensus can be formed at either the input of the coordination algorithm, the output, or both.

We will focus on the case where the output data (coordination variable) is to be synchronized.

Approach

Developed mathematical theory for consensus algorithms over distributed, time-varying, noisy communication channels. Algorithms interface cooperative control algoithms with the communcation network.



Results

Successful application in simulation to:

- UAV and spacecraft formation flying
- Mobile ground robots
- Cooperative rendezvous
- Cooperative perimeter surveillance
- Cooperative search

Flight results for cooperative perimeter surveillance demonstrated in 2007.