Big questions/topics of interest:

1. How to establish a common reference frame for coordination & task assignment in the absence of measurements in a pre-defined global frame
2. Use of coordinated maneuvers to improve absolute or relative state estimates
3. What benefit can be achieved through sharing high-quality state measurements (e.g. IMU data) even if this action requires a minimum range to the cooperating vehicle

Additional factors to consider:

* Effect of limited or incorrect attitude knowledge, e.g. heading estimate bias error; can this be corrected via sharing of measurements? How can we minimize yaw estimate drift in a system with no global yaw rate update?
* How can we quickly cascade high-precision, possibly intermittent, inertial position measurements, e.g. GPS, available to a subset of vehicles, through a network of cooperating agents?
* Estimation frameworks: EKF, particle filter, …?

For the purposes of establishing a common framework for evaluating various techniques, it was suggested that I generate a simulation environment with truth data for several (~10) agents. Work can start by considering a subset of agents and/or measurements. I set up a framework that will simulate a system of different agents and log data at 100 Hz. Currently, I have only one agent type – planar dynamics with a constant speed and random heading changes every second. I have written scripts for simulating and loading data. This idea of a “common framework” can only handle open-loop sensing and estimation and will have to be modified when/if closed-loop control is to be considered. Also, any process noise needs to be considered before generating data.