Related Work Survey

3D Path Planning for UAVs for Maximum Information Collection

- URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6564676
- Plans the paths of UAVs in 3 dimensions that avoids forbidden regions and maximizes information collection from desired regions
- Formulates problem as a multiple Travelling Salesman Problem and uses the Pattern Search method to solve this problem.
- Using the grid of desired and forbidden regions, this approach uses a genetic algorithm with initial population of the solutions from the mTSP to optimize the waypoints being used for the UAVs.
- They don't talk about scalability, they only did tests with up to 3 UAVs, and they are using a GA whilst solving mTSP. It is probably safe to say that their algorithm doesn't scale well with respect to anything in their parameter space.

Path Planning of Autonomous Underwater Vehicles for Adaptive Sampling Using Mixed Integer Linear Programming

- URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4768634
- Path planning algorithm that optimizes an objective function to move around the ocean to collect information about desired regions
- It is assumed that the desired regions are known *a priori*
- The objective is to sample the regions of greatest uncertainty and to maximize the information gain
- It plans using a constraint programming based on motion constraints
- I have no idea what their results are supposed to mean

Physics-Inspired Robotic Motion Planning for Cooperative Bayesian Target Detection

- Uses a states of matter approach for area coverage and target detection / tracking.
- At gas state, the quads move down a surface gradient w/ random walk
- At liquid state, quads move down a potential surface

- At solid state, quads move down a potential gradient and have a spring force between other quads
- The surface simulates the temperature and is governed by an inverse log likelihood ratio w/ temperature diffusion.
- When target is "seen", the area within a certain radius of the target on the surface gets its value decremented and the heat is diffused.
- Has inherent potential field issues (i.e. valleys, riveras, local minima)
- Non simulation testing has only been performed with one quadrotor.
- Does NOT perform well for coverage, but does very well for tracking.