Commentary on "Planning for an Ocean Global Surveillance Mission" by C. Pralet et al.,

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Summary

The paper presents a planning system being used in mission analysis/design for an ocean observing mission. The observing involves a general surveillance coverage problem as well as a focused followup surveillance problem (the classic detection and exploitation problems).

The authors present two greedy algorithms for solving these problems, with empirical results for scaling problems. The work is of great interest because it addresses a problem which occurs frequently in the mission design phase and this application can serve as an excellent path into supporting mission operations.

Commentary

The papers application is very interesting. It would be useful to see comparisons with several related prior works, although some of these are not in easily accessible forms.

- Russell Knight of JPL has been using the CLASP scheduler to evaluate coverage problems in support of the Desdyni mission design. Both large scale mapping and rapid response targeting is addressed. However, I do not know of any paper describing this work in detail (see Knight IWPSS 2006 and also below on CLASP). Perhaps you could contact him.
- CLASP has also been adapted in a prototype for Odyssey/THEMIS observation planning (see Rabideau et al. SPARK 2010). This paper as well as (Mclaren et al. IWPSS2011) describes this application in greater detail.

In particular it appears that you are using a grid-based method to evaluate spatial coverage, which is the same method used in CLASP (although a direct shard representation is being developed). If you could confirm this that would be great (the grid based spatial coverage method is described in the SPARK paper).

Other questions that come to mind are:

- What other search methods did you consider, why did you feel that your particular approach was a good match for the problem.
- It would be interesting if you could qualitatively characterize the class of problems for which your greedy algorithms will work well, e.g. what is your best guess as to the limits of the approach?
- How do you expect the model to change, be augmented, as the mission study may progress to implementation, operations, etc.
- Is there any comparison that you might be able to make to optimal bounds, or approximation of such bounds?