

Guy Hoffman
Fall 2003

A Reading of
Hank Jones and Pamela Hinds'

Extreme Work Teams: Using SWAT Teams As a Model for Coordinating
Distributed Robots

This paper is roughly divided into two parts: an empirical study of SWAT team operation and field command; and a description of a multi-robot control system inspired in part by the findings in the first part of the paper.

According to the paper, a critical factor in SWAT team operation is the establishment and maintenance of common ground by the Tactical Commander (TC) of the team. The TC starts out by establishing common ground ahead of the mission: in training and in the Situation Report. During the mission, the TC serves as a nexus of information, channelling data about the world to the various units of the force. The authors note that an important aspect of this work is the fusion of information from multiple sources and the dispatch of this information *in the relevant reference frame* to each unit.

In the experimental part of this paper, Jones and Hinds suggest a control mechanism for the operation of multiple robots by a single user. This system is based on a discussion channel between the operator and the agents, as well as a "Correspondence Agent" responsible for merging information from different perspectives while maintaining the relevant reference frame for this information.

I agree that it's interesting to look at human teams that operate towards common goal when designing artificial systems. Emergency response teams, in particular those with a para-military deployment, are particularly good examples of semi-automated interaction. Due to the rigid training and encompassing discipline and control structure, one can look at these kinds of teams as centrally controlled, rule-based teams of partly-autonomous agents. In reality, these teams are of course not as simple and smooth-operating as this paper's somewhat overly romantic description might convey.

Communication is of course vital to the operation of such teams, and the focus that the authors put on synchronization of information and the translation of this information to the correct reference frame is called for.

The experimental system proposed does not appear to be fully developed or explored. I did find two things inspiring, though: first, the use of a combined human (speech/discussion) and computer (dialog boxes) interface that complement each other nicely. The other is the idea of a CA, which merges objects from different perspectives into a coherent world, while still retaining private points-of-views on objects in the world. These are POVs that the agents can relate to. This is, in my opinion, the main contribution of this paper.