# Technical Status Report                                    January, 2002

DARPA Agent Based Computing (ABC) Program, Taskable Agent Software Kit (TASK)

PI: Lee Spector, Hampshire College

Project: Multi-type, Self-Adaptive Genetic Programming for Complex Applications

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## Accomplishments This Quarter

• Revised accepted article, "Genetic Programming and Autoconstructive Evolution with the Push Programming Language," for the journal *Genetic Programming and Evolvable Machines.*

• Submitted two papers ("Speciation and adaptation in endogenously diversifying populations of digital organisms" and "Size Control via Size Fair Genetic Operators in the PushGP Genetic Programming System" to the Genetic and Evolutionary Computation Conference (GECCO-2002).

• Worked with CAHDE group to prepare for the January PI meeting in Washington D.C. Slides for the presentation to the PI meeting are attached.

• Produced, with physicist Herbert J. Bernstein, a draft write-up of our work on quantum communication strategies evolved by genetic programming ("Communication through certain quantum gates of interest, discovered in part by genetic programming").

• Explored the ways in which evolved transport network agents, evolved under various environmental conditions, respond to sudden changes in their environments. A write-up of this work is in progress.

## Current Plans

• Work with the CAHDE group to redefine project goals and collaborations in light of the January PI meeting and subsequent changes to the TASK program.

• Meet with the Dartmouth group to extend collaboration on evolved agent-controllers in continuous 3D environments.

• Collaborate with the University of New Mexico group on the utility of modular architectures for agents evolving in dynamic environments. The UNM group presented this work at the January PI meeting and we have begun to conduct follow-up tests.